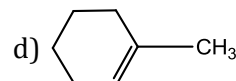
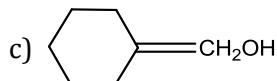
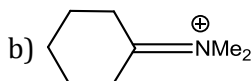
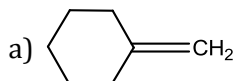
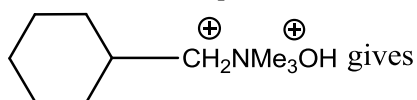


13. HYDROCARBONS

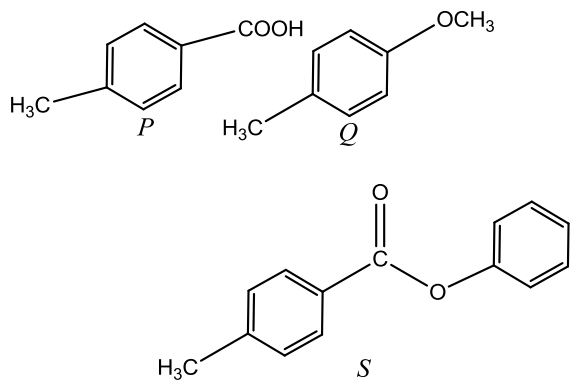
Single Correct Answer Type

1. Thermal decomposition of

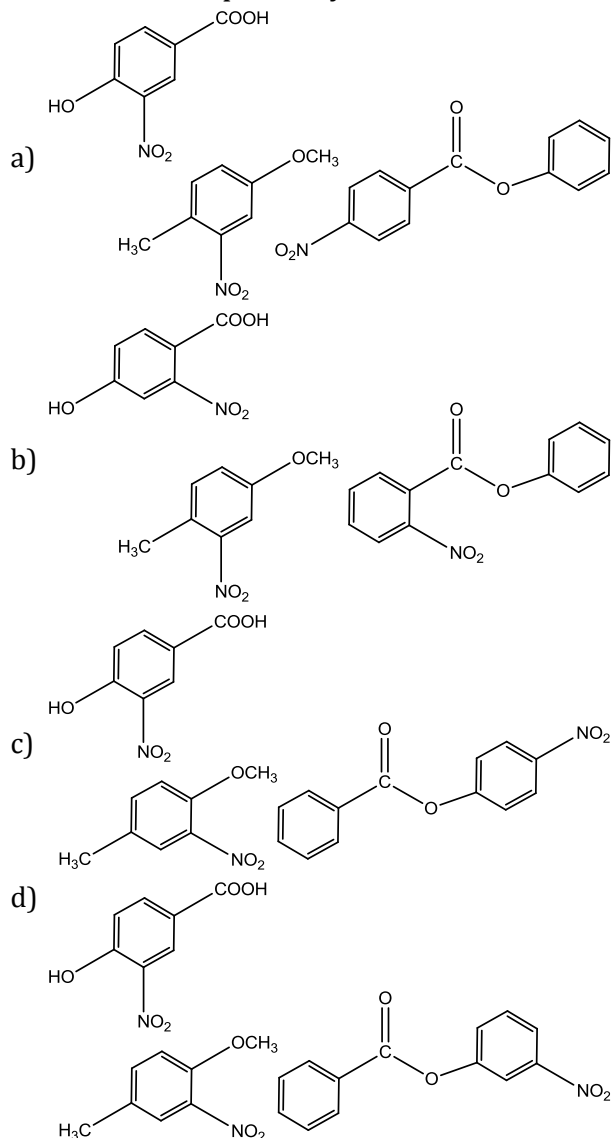


2. Which of the following is not a petroleum product?
 a) Petrol b) Paraffin wax c) Bees wax d) Kerosene
3. A knocking sound is produced more in the engine when the fuel contains mainly:
 a) *n*-alkanes b) CO₂ c) CO d) Lubricating oil
4. Reaction of HBr with propene in presence of peroxides gives:
 a) Isopropyl bromide b) 3-bromopropane c) Allyl bromide d) *n*-propyl bromide
5. The next higher homologue of C₆H₁₄ is:
 a) C₇H₁₄ b) C₇H₁₆ c) C₇H₁₀ d) C₇H₁₂
6. The reaction conditions used for converting 1,2-dibromopropane to propylene are
 a) KOH, alcohol/Δ b) KOH, water/Δ c) Zn, alcohol/Δ d) Na, alcohol/Δ
7. A gas formed by the action of alcoholic KOH on ethyl iodide, decolourises alkaline KMnO₄. The gas is
 a) C₂H₆ b) CH₄ c) C₂H₂ d) C₂H₄
8. Alkyne, C₇H₁₂, when reacted with alkaline KMnO₄ followed by acidification with HCl gives a mixture of (CH₃)₂CHCOOH + CH₃CH₂COOH. The alkyne C₇H₁₂ is
 a) 3-hexyne b) 2-methyl-2-hexene c) 2-methyl-3-hexene d) 3-methyl-2-hexyne
9. The relationship between acetylene and benzene is comparable to the relationship between propyne and
 a) Dimethyl benzene b) Neoprene c) Propyl benzene d) Mesitylene
10. Complete oxidation of one mole of an alkane forms 3 moles of CO₂. The alkane is
 a) CH₄ b) C₂H₆ c) C₃H₈ d) C₆H₁₄
11. The ozonolysis of ethylene, acetylene and propylene respectively gives:
 a) HCHO, CHO—CHO and CH₃CHO + HCHO
 b) CHO—CHO, HCHO and CH₃CHO
 c) HCHO + CH₃CHO, CHO—CHO and HCHO
 d) CHO—CHO, CH₃CHO + HCHO and HCHO
12. The reaction, CH₂ = CH₂ + CH₃COCl $\xrightarrow{\text{AlCl}_3}$ gives the product:
 a) CH₃COCH₂CH₂Cl
 b) CH₃.CH₂.CH₂Cl
 c) CH₃COCH₂.CH₂COCH₃
 d) ClCH₂CH₂Cl
13. Alkyl halides react with dialkyl copper reagents to give
 a) Alkenyl halides b) Alkanes
 c) Alkyl copper halides d) Alkenes
14. The gas which is used for the artificial ripening of fruits is:
 a) C₂H₆ b) C₂H₂ c) C₂H₄ d) Marsh gas
15. CH₃—C ≡ CH reacts with HCl to give:
 a) 2,2-dichloropropane b) 1,1-dichloropropane c) 1,2-dichloropropane d) 1-chloropropane

16. $\text{CH}_3\text{CH}_3 + \text{HNO}_3 \xrightarrow{675\text{ K}} ?$
 a) $\text{CH}_3\text{CH}_2\text{NO}_2$ b) $\text{CH}_3\text{CH}_2\text{NO}_2 + \text{CH}_3\text{NO}_2$
 c) $2\text{CH}_3\text{NO}_2$ d) $\text{CH}_2 = \text{CH}_2$
17. Which of the following is produced when coal is subjected to destructive distillation?
 a) Methane b) Ethane c) Acetylene d) Coal gas
18. The product of the following reaction are:
 $\text{CH}_3\text{C}\equiv\text{C} \cdot \text{CH}_2\text{CH}_3 \xrightarrow[\text{(ii) Hydrolysis}]{\text{(i) O}_3} ?$
 a) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COCH}_3$
 b) $\text{CH}_3\text{COOH} + \text{CH}_3\text{CH}_2\text{COOH}$
 c) $\text{CH}_3\text{CHO} + \text{CH}_3\text{CH}_2\text{CHO}$
 d) $\text{CH}_3\text{COOH} + \text{CO}_2$
19. Methyl bromide heated with zinc in closed tube produces:
 a) Methane b) Ethane c) Ethylene d) Methanol
20. Aqueous solution of an organic compound, 'A' on electrolysis liberates acetylene and CO_2 at a node. 'A' is
 a) Potassium acetate b) Potassium succinate
 c) Potassium citrate d) Potassium maleate
21. The reaction of alkanes with halogen is explosive in the case of:
 a) F_2 b) Cl_2 c) I_2 d) Br_2
22. Which of the following is unsymmetrical alkene?
 a) 1-butene b) 2-hexene c) 1-pentene d) All of these
23. Which of the statement is wrong for alkanes?
 a) Most of the alkanes are soluble in water
 b) Their density is always less than water
 c) At room temperature some alkanes are liquid, some solid and other are gases
 d) All alkanes burn
24. Propane cannot be prepared from which reaction?
 a) $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow[\text{OH}^-]{\text{B}_2\text{H}_6}$ b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{I} \xrightarrow[\text{P}]{\text{HI}}$
 c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COONa} \xrightarrow{\text{NaOH/CaO}, \Delta}$ d) None of the above
25. Nitrating mixture is
 a) Fuming nitric acid
 b) Mixture of conc. H_2SO_4 and conc. HNO_3
 c) Mixture of nitric acid and anhydrous zinc chloride
 d) None of the above
26. Cyclohexene on reaction with OsO_4 followed by reaction with NaHSO_3 gives
 a) *cis* - diol b) *trans* - diol c) Epoxy d) Alcohol
27. Al_4C_3 on hydrolysis yields
 a) Nitrogen gas b) Methane gas c) Hydrogen gas d) Carbon dioxide
28. The compounds P, Q and S



where separately subjected to nitration using $\text{HNO}_3/\text{H}_2\text{SO}_4$ mixture. The major product formed in each case respectively, is



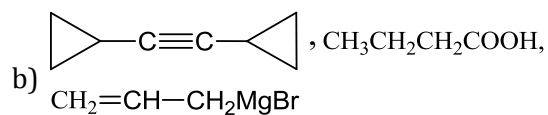
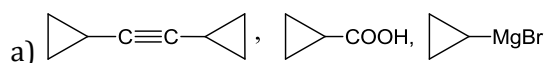
29. Which of the following is not a mixture of hydrocarbons?

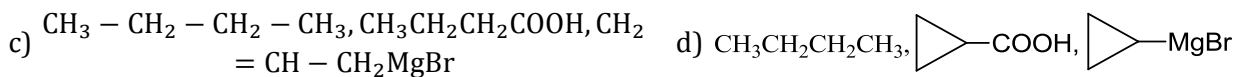
- a) Candle wax b) Kerosene c) Vegetable oils d) Paraffin oil

30. $\text{C}_8\text{H}_{10}(A) \xrightarrow{\text{O}_3/\text{H}_2\text{O}} \text{acid}(B)$

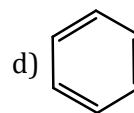
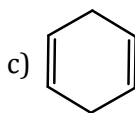
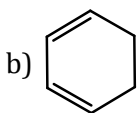
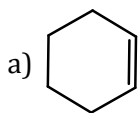
$\text{C}_3\text{H}_5\text{MgBr}(C) \xrightarrow{\text{CO}_2, \text{H}_3\text{O}^+} \text{acid } B$

Identify A , B and C





31. Which of the following has the maximum heat of hydrogenation?



32. $\text{CH}_3\text{CH}_2\text{CH}_3 \xrightarrow{400-600^\circ\text{C}} \text{X} + \text{Y}$, X and Y are

a) Hydrogen and methane

b) Hydrogen and ethylene

c) Ethylene and methane

d) Any of these

33. Position of double bond in alkenes is identified by

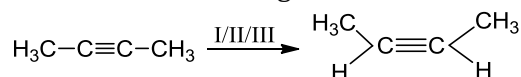
a) Ozonolysis

b) Bromine water

c) Ammonical silver nitrate

d) None of these

34. Consider the following reaction



I. $\text{H}_2/\text{Ni}_2\text{B}$

II. $\text{H}_2/\text{Pd} - \text{CaCO}_3$ in quinoline

III. Na/NH_3 or LiAlH_4

This reaction takes place by

a) I or II

b) I or III

c) II or III

d) I, II or III

35. Which of the following reagent can distinguish between 1-butyne and 2-butyne?

a) Aqueous NaOH

b) Bromine water

c) Fehling's solution

d) Ammoniacal AgNO_3

36. CH_4 is formed when:

a) Sodium acetate is heated with soda lime

b) Iodo methane is reduced

c) Aluminium carbide reacts with water

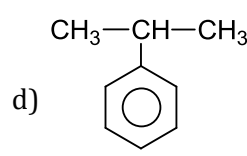
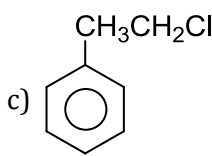
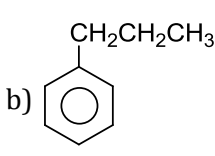
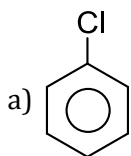
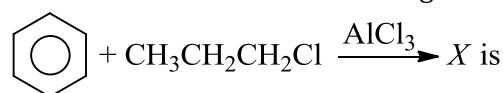
d) All of the above

37. Reaction of HBr with propene in the presence of peroxide gives

a) *iso*-propyl bromide b) 3-bromo propane c) Allyl bromide

d) *n*-propyl bromide

38. Predict structure of X in following reaction



39. The middle oil fraction of coal-tar distillation contains:

a) Benzene

b) Anthracene

c) Naphthalene

d) Xylene

40. On halogenation, an alkane (C_5H_{12}) gives only one monohalogenated product. The alkane is

a) *n*-pentane

b) 2-methyl butane

c) 2, 2-dimethyl propane

d) Cyclopentane

41. Acrylic emulsion in paints is a polymer of:

a) $\text{CH}_2 = \text{CH} - \text{COOCH}_3$

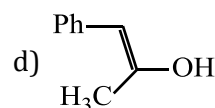
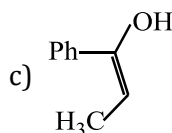
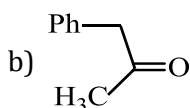
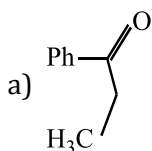
b) $\text{CH}_3 - \text{CH} = \text{CH} - \text{COOCH}_3$

c) $\text{CH}_2 = \text{CH} - \text{COOH}$

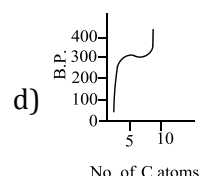
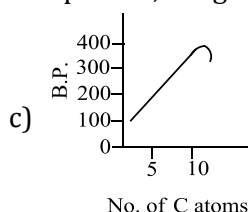
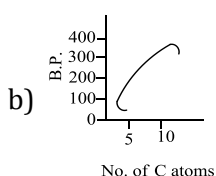
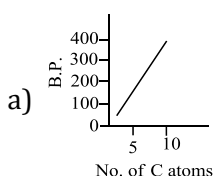
- d) $\text{CH}_2 = \text{C}(\text{CH}_3) - \text{COOCH}_3$
42. A hydrocarbon X adds on one mole of hydrogen to give another hydrocarbon and decolourised bromine water. X react with KMnO_4 in presence of acid to give two mole of the same carboxylic acid. The structure of X is:
- a) $\text{CH}_3\text{CH} = \text{CHCH}_2\text{CH}_2\text{CH}_3$
 b) $\text{CH}_3\text{CH}_2\text{CH} = \text{CHCH}_2\text{CH}_3$
 c) $\text{CH}_3\text{CH}_2\text{CH}_2 - \text{CH} = \text{CHCH}_3$
 d) $\text{CH}_2 = \text{CH} - \text{CH}_2\text{CH}_2\text{CH}_3$
43. An anaesthetic narcylene is commercial name of:
- a) C_2H_4 b) C_2H_2 c) CHCl_3 d) ether
44. By which one of the following compounds both CH_4 and $\text{CH}_3 - \text{CH}_3$ can be prepared in one step?
- a) CH_3I b) CH_3OH c) $\text{CH}_3\text{CH}_2\text{I}$ d) $\text{C}_2\text{H}_5\text{OH}$
45. What volume of methane (NTP) is formed from 8.2 g of sodium acetate by fusion with sodalime?
- a) 10 litre b) 11.2 litre c) 5.6 litre d) 2.24 litre
46. When methyl iodide is treated with sodium in ethereal solution, it gives
- a) Methane b) Ethane
 c) Methyl sodium iodide d) Sodium methoxide
47. 2-methylpentene 2 on ozonolysis will give:
- a) Only propanal
 b) Propanal and ethanal
 c) Propanone-2 and ethanal
 d) Propanone-2 and propanal
48. The reaction,
- $$2\text{RC}\equiv\text{CCu} \xrightarrow[\text{Pyridine}]{(\text{CH}_3\text{COO})_2\text{Cu}} \text{R}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{R}$$
- a) Eglinton's reaction
 b) Glaser reaction
 c) Gomberg-Beckmann's reaction
 d) Leuckart reaction
49. 2-Hexyne gives *trans*-2-hexene on treatment with:
- a) Li/NH_3 b) Pd/BaSO_4 c) LiAlH_4 d) Pt/H_2
50. Which of the following will give three mono-bromo derivatives?
- a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$ b) $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_3$
 c) $\text{CH}_3\text{CH}_3(\text{CH}_3)\text{CH}(\text{CH}_3)\text{CH}_3$ d) All the above can give
51. The reagent for the following conversion
 $\text{Br}-\text{CH}_2-\text{CH}_2-\text{Br} \rightarrow \text{H}-\text{C}\equiv\text{C}-\text{H}$ is/are :
- a) Alc. KOH b) Alc. KOH followed by NaNH_2 c) Aqueous KOH followed by NaNH_2 d) $\text{Zn}/\text{CH}_3\text{OH}$
52. In a reaction if half of the double bond is broken and two new bonds are formed, this is a case of:
- a) Elimination b) Addition c) Displacement d) Rearrangement
53. Which represents a cyclic alkane?
- a) C_3H_6 b) C_3H_8 c) C_8H_{10} d) C_8H_{12}
54. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \xrightarrow[\text{HBr}]{\text{AlCl}_3}$ Product
- Product in the above reaction is
- a) $\text{CH}_3 - \text{CH}(\text{Br}) - \text{CH}_2 - \text{CH}_3$ b) $\text{CH}_3 - \text{CH}(\text{CH}_3) - \text{CH}_2 - \text{CH}_3$
 c) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ d) All of these

BrBr

55. According to Huckel's rule an aromatic compound must possess
a) $(4n + 1)\pi$ -electrons b) $(4n + 2)\pi$ -electrons
c) $4n \pi$ -electrons d) $(4n + 3)\pi$ -electrons
56. Acetylene gives:
a) White ppt. with AgNO_3 and red ppt. with Cu_2Cl_2
b) White ppt. with Cu_2Cl_2 and red ppt. with AgNO_3
c) White ppt. with both
d) Red ppt. with both
57. 1,1,2,2-tetrabromoethane on heating with Zn powder in alcohol finally gives:
a) Methane b) Ethane c) Ethyne d) Ethene
58. The carbide which reacts with water to form ethyne is
a) CaC_2 b) SiC c) Mg_2C_3 d) Al_4C_3
59. What is the product when 2-butyne is treated with liquid NH_3 in presence of lithium?
a) *n*-butane b) *cis*-2-butene c) *trans*-2-butene d) 1-butene
60. $\text{Ph}-\text{C}\equiv\text{C}-\text{CH}_3 \xrightarrow{\text{Hg}^{2+}/\text{H}^+} \text{A}$. A is:



61. 1-butyne on reaction with hot alkaline KMnO_4 gives:
a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$
b) $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2$
c) $\text{CH}_3\text{CH}_2\text{COOH}$
d) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$
62. Which statement is not correct in case of ethane?
a) It can be catalytically hydrogenated
b) When burnt produces CO_2 and H_2O
c) It is homologue of isobutane
d) It can be chlorinated with chlorine
63. CH_3COCH_3 can be converted to $\text{CH}_3\text{CH}_2\text{CH}_3$ by the action of
a) HNO_3 b) HIO_3 c) H_3PO_3 d) HI
64. When ethyl chloride and alcoholic KOH are heated, the compound obtained is
a) C_2H_4 b) C_2H_2 c) C_6H_6 d) C_2H_6
65. Which of the following will react with sodium metal?
a) Ethene b) Propyne c) But-2-yne d) Ethane
66. When the boiling point of the first ten normal alkanes are plotted, the graph looks like:

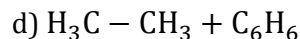
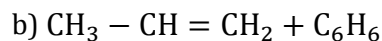
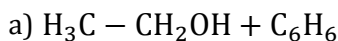


67. Which is generally used as reducing agent in organic chemistry?
a) $\text{Zn} + \text{HCl}$ b) $\text{Zn} + \text{CH}_3\text{COOH}$ c) $\text{Zn}/\text{Hg} + \text{HCl}$ d) $\text{Na} + \text{C}_2\text{H}_5\text{OH}$
68. Alkynes can be reduced to alkenes by hydrogenation in presence of:
a) Raney Ni b) Anhy. AlCl_3 c) Pd d) Lindlar's catalyst
69. Which reagent distinguishes ethylene from acetylene?
a) Aqueous alkaline permanganate
b) Chlorine dissolved in carbon tetrachloride

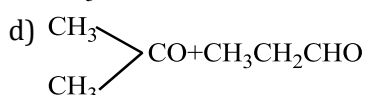
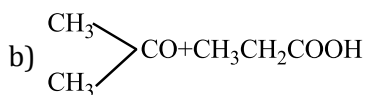
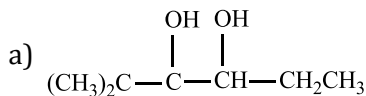
- c) Ammoniacal cuprous chloride
d) Concentrated sulphuric acid
70. By heating tetraethyl ammonium hydroxide, the product formed are:
a) C_2H_4
b) $(C_2H_5)_3N$
c) H_2O
d) All of these
71. Addition of ICl on propene gives the product:
a) $CH_3CHClCH_3$ b) CH_3CHICH_2Cl c) $CH_3CHClCH_2I$ d) $CH_3CHClCH_2Cl$
72. Which of the following alkenes gives on acetaldehyde on ozonolysis?
a) Ethene b) Propene c) 1-butene d) 2-butene
73. In the following sequence of reactions, the alkene affords the compound 'B'

$$CH_3CH=CHCH_3 \xrightarrow{O_3} A \xrightarrow{H_2O} B$$
The compound *B* is
a) CH_3CH_2CHO b) CH_3COCH_3 c) $CH_3CH_2COCH_3$ d) CH_3CHO
74. $CH_3CH=CH-CH_3 + CH_2N_2 \rightarrow A$; *A* is
a) $\begin{array}{c} CH_3CH-CH-CH_3 \\ | \quad | \\ CH_3 \quad N_2 \end{array}$ b) $\begin{array}{c} CH_3-CH-CH-CH_3 \\ \quad \diagdown \quad \diagup \\ \quad \quad CH_2 \end{array}$
c) Both (a) and (b) d) None of these
75. Direct fluorination of alkanes is not made because:
a) Reaction does not occur
b) Alkane fluorides are not formed
c) Reaction occurs violently
d) None of the above
76. On monochlorination of *n*-pentane, the number of isomers formed is:
a) 4 b) 3 c) 2 d) 1
77. Which of the following is the predominant product in the reaction of $HOBr$ with propene?
a) 2-bromo-1-propanol b) 3-bromo-1-propanol
c) 2-bromo-2-propanol d) 1-bromo-2-propanol
78. Acetylene is prepared industrially by passing electric discharge through graphite electrodes in the atmosphere of:
a) Air b) N_2 c) H_2 d) CO_2
79. The reaction of an aromatic halogen compound with an alkyl halide in presence of sodium in ether is called
a) Sandmeyer's reaction b) Wurtz reaction
c) Kolbe reaction d) Wurtz-Fittig reaction
80. How many isomeric forms of pentane exist?
a) 3 b) 2 c) 5 d) 6
81. Alkanes mainly show reactions involving:
a) Carbonium formation
b) Ionic elimination
c) Ionic formation
d) Heat/photochemical substitution
82. Ozonolysis of an organic compound *A* produces acetone and propionaldehyde in equimolar mixture. Identify *A* from the following compounds.
a) 2-methyl-1-pentene b) 1-pentene
c) 2-pentene d) 2-methyl-2-pentene
83. Using anhydrous $AlCl_3$ as catalyst, which one of the following reactions produce

ethylbenzene(PhEt)?



84. On vigorous oxidation by alkaline permanganate solution $(\text{CH}_3)_2\text{C} = \text{CH} - \text{CH}_2\text{CHO}$ gives:



85. The compound that is most reactive towards electrophilic nitration is

a) toluene

b) benzene

c) benzoic acid

d) nitrobenzene

86. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is

a) Propene

b) 1-butene

c) 2-butene

d) Ethene

87. The conversion of propene to propanol is ... type of reaction.

a) Hydrogenation

b) Hydration

c) hydrolysis

d) Dehydrogenation

88. When *n*-hexane/*n*-heptane is passed through Cr_2O_3 supported over alumina at 600°C gives:

a) Hexane

b) Hexyne

c) Benzene, Toluene

d) None of these

89. If 20cm^3 of methane (CH_4) is burnt using 50cm^3 of oxygen. The volume of the gases left after cooling to room temperature will be:

a) 60cm^3

b) 70cm^3

c) 30cm^3

d) 50cm^3

90. An alkane of mol. weight 72 gives on monochlorination only one product. Name the alkane:

a) 2-methylbutane

b) *n*-pentane

c) 2,2-dimethylpropane

d) None of these

91. The number of disubstituted products of benzene is

a) 2

b) 3

c) 4

d) 5

92. The treatment of $R'\text{MgX}$ with $\text{RC} \equiv \text{CH}$ produces

a) RH

b) $\text{R}'\text{H}$

c) $\text{R} - \text{R}$

d) $\text{R} - \text{R}'$

93. Electrolysis of an aqueous solution of sodium acetate, yields

a) Ethane

b) Ethene

c) Ethyne

d) Propane

94. Propyne on passing through red hot copper tube forms

a) benzene

b) Toluene

c) Mesitylene

d) None of these

95. Among the following, the compound that be most readily sulphonated is

a) Benzene

b) Nitrobenzene

c) toluene

d) chlorobenzene

96. Propylene on hydrolysis with sulphuric acid forms

a) *n*-propyl alcohol

b) Isopropyl alcohol

c) Ethyl alcohol

d) Butyl alcohol

97. What is the product formed when acetylene reacts with hypochlorous acid?

a) CH_3COCl

b) ClCH_2CHO

c) Cl_2CHCHO

d) ClCH_2COOH

98. When CaC_2 was hydrolysed a gas was obtained. It had a garlic odour due to phosgene present as impurity. The gas was passed through ammoniacal solution of Cu_2Cl_2 , a red ppt. was obtained. The gas was:

a) Ethylene

b) Propyne

c) Acetylene

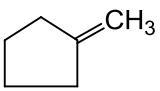
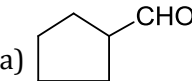
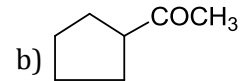
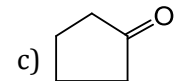
d) Ethane

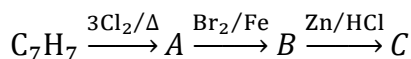
99. Alkenes undergo

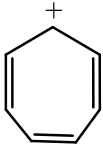
a) Addition reactions

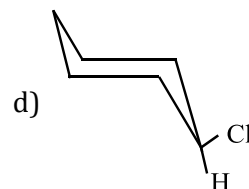
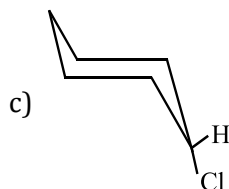
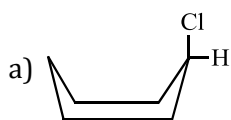
b) Substitution reactions

c) Both (a) and (b)

- d) None of these
100. Aromatic compound among other things should have a π -electron cloud containing $(4n + 2)\pi$ electrons where, n cannot be
- a) $\frac{1}{2}$ b) 3 c) 2 d) 1
101. Polymer of propyne is:
- a) Polyethylene b) Polythene c) Benzene d) Mesitylene
102. Which of the following has the least octane number?
- a) Octane b) Cetane c) 2,2,4-trimethylpentane d) *n*-heptane
103. Name the reaction $C_3H_6 \rightarrow C_3H_8$:
- a) Alkylation b) Cracking c) Hydrogenation d) Dehydrogenation
104. The tar which is used to make roads is a solid known as:
- a) Pitch b) Paraffin wax c) Coal d) None of these
105. Thermal decomposition of alkanes in the absence of air is called
- a) Cracking b) Oxidation c) Combustion d) Hydrogenation
106. The conditions for aromaticity is
- a) Molecule must have clouds of delocalised π -electrons
- b) Molecule must contain $(4n + 2)\pi$ -electrons
- c) Both (a) and (b)
- d) None of the above
107. C_2-C_3 bond length in but-1,3-diene is:
- a) 1.46Å b) 1.20Å c) 1.39Å d) 1.34Å
108. For synthesis of 1-butene, CH_3MgI should be treated with
- a) Propene b) 2-chloropropene c) Allyl chloride d) Ethyl chloride
109. The highest boiling point is expected for
- a) *n*-butane b) *iso*-octane
- c) *n*-octane d) 2,2,3,3-tetramethyl butane
110. When butane-1 is mixed with excess of bromine, the expected reaction product is:
- a) Hydrogen bromide b) Butylene gas c) 1,2-dibromobutane d) Perbromobutane
111. An alkene having molecular formula C_9H_{18} on ozonolysis gives 2, 2-dimethyl propanal and 2-butanone. The alkene is
- a) 2,2,2-trimethyl-3-hexene b) 2,2,6-trimethyl-3-hexene
- c) 2,3,4-trimethyl-2-hexene d) 2,2,4-trimethyl-3-hexene
112. Propene on reaction with diazomethane in presence of UV radiations gives:
- a) Cyclopropane b) Methyl cyclopropane c) Butane d) Butene
113. Both methane and ethane may be obtained by a suitable one-step reaction from
- a) CH_3I b) C_2H_5I c) CH_3OH d) C_2H_5OH
114. The product (s) obtained *via* oxymercuration ($HgSO_4 + H_2SO_4$) of but-1-yne would be
- a) $CH_3CH_2COCH_3$ b) $CH_3CH_2CH_2CHO$
- c) $CH_3CH_2CHO + HCHO$ d) $CH_3CH_2COOH + HCOOH$
115. Alkene-1 on hydroboration followed with action of H_2O_2 gives:
- a) Alkanol-2 b) Alkanol-1 c) Alkanal d) Alkanone
116.  on ozonolysis gives
- a)  b)  c)  + HCHO d) None of these
117. The compound 'C' in the following reaction is



- a) *o*-bromotoluene
c) *p*-bromotoluene
- b) *m*-bromotoluene
d) 3-bromo-2,4,6-trichlorotoluene
118. Iodination of alkane is made in presence of:
a) $KMnO_4$
b) HgO or HIO_3
c) $K_2Cr_2O_7$
d) None of these
119. Pick out the wrong statement.
a) Toluene shows resonance
- b)  is non-aromatic.
c) The hybrid state of carbon in carbonyl group is sp^2 .
d) The hyperconjugative effect is known as no bond resonance.
120. An alkene on vigorous oxidation with $KMnO_4$ gives only acetic acid. The alkene is
a) $CH_3CH_2CH=CH_2$
b) $CH_3CH=CHCH_3$
c) $(CH_3)_2C=CH_2$
d) $CH_3CH=CH_2$
121. A hydrocarbon reacts with hypochlorous acid to give 2-chloroethanol. The hydrocarbon is:
a) Methane
b) Ethylene
c) Acetylene
d) Ethane
122. The angle strain in cyclobutane is
a) $24^\circ 44'$
b) $29^\circ 16'$
c) $19^\circ 22'$
d) $9^\circ 44'$
123. During chlorination of methane usually a mixture of all the chlorinated products, *i.e.*, methyl chloride, methylene dichloride, chloroform and carbon tetrachloride are obtained. What will happen, if we use excess of Cl_2 in this reaction?
a) Only methyl chloride will be formed
b) Only chloroform will be formed
c) Only CCl_4 will be formed
d) Only methylene dichloride will be formed
124. Aromatization of *n*-heptane and *n*-octane gives respectively:
a) Toluene, ethyl benzene
b) Ethyl benzene, toluene
c) Toluene, benzene
d) Benzene, ethyl benzene
125. Which of the following organic compounds exhibit acidic character?
a) $H_3C-C\equiv CH$
b) $H_3C-C\equiv C-CH_3$
c) $H_2C=CH_2$
d) H_3C-CH_3
126. Sodium formate on heating with soda lime gives:
a) CH_4
b) CO_2
c) H_2
d) All of these
127. Which of the following can be used for preparation of propane?
a) $CH_3CH=CH_2 \xrightarrow[2. AgNO_3/NaOH]{1. B_2H_6}$
b) $CH_3CH_2CH_2Cl \xrightarrow[2. H_2O_2]{1. Mg/ether}$
c) $CH_3CH_2CH_2I \xrightarrow{HI/\Delta, 150^\circ C}$
d) $CH_3CH_2CH_2COONa \xrightarrow[\Delta]{NaOH(CuO)}$
128. The marsh gas detector used by miners works on the principle of:
a) Difference in the rates of diffusion of gases
b) Avogadro's hypothesis
c) Gay-Lussac's law of gaseous volumes
d) Berzelius hypothesis
129. The compound with highest boiling point.
a) *n*-hexane
b) *n*-pentene
c) 2,2-dimethyl propane
d) 2-methyl butane
130. The most stable conformation of chlorocyclohexane at room temperature is:



131. Acetylene is not used in making:

- a) Textile yarn b) PVC c) Glucose d) Drugs

132. An aromatic compound 'X' with molecular formula C_8H_{10} produces on nitration one mononitro derivative and three dinitro derivatives. Compound 'X' would be

- a) Ethyl benzene b) *m*-xylene c) *o*-xylene d) *p*-xylene

133. That acetylene is a linear molecule is shown by

- a) Its $C \equiv C$ bond distance being 1.21 \AA b) Its $C - H$ bond distance being 1.08 \AA
c) Its $H - C - C$ bond angle being 180° d) All of the above

134. Benzene on treatment with a mixture of conc. HNO_3 and conc. H_2SO_4 at $100^\circ C$ gives

- a) Nitrobenzene b) *m*-dinitrobenzene c) *p*-dinitrobenzene d) *o*-dinitrobenzene

135. Which of the following differs with the other three?

- a) Naphthalene b) Ethylene c) Toluene d) Xylene

136. A saturated hydrocarbon is shown by C_nH_{10} . The value of carbon atom 'n' in this compound is:

- a) 2 b) 4 c) 5 d) 6

137. Which of the following reactions will yield, 2, 2-dibromopropane?

- a) $CH_3 - C \equiv CH + 2HBr \rightarrow$ b) $CH_3CH = CHBr + HBr \rightarrow$
c) $CH \equiv CH + 2HBr \rightarrow$ d) $CH_3 - CH = CH_2 + HBr \rightarrow$

138. $CH_2 = CH_2$ reacts with HCl to form:

- a) $CH_2CH_2Cl_2$ b) CH_2ClCH_3 c) CH_2ClCH_2Cl d) CH_3CHCl_2

139. Reduction of carbonyl compounds to alkanes with $NH_2 - NH_2$ and $NaOH$ is called:

- a) Clemmensen reduction
b) Wolff-Kishner reduction
c) Wurtz's reaction
d) Pongroff Verley reduction

140. The compound which cannot decolourise alkaline $KMnO_4$:

- a) Acetylene b) Ethanol c) Ethanal d) Ethane

141. Which one of the following can distinguish propyne from propene?

- a) Br_2 water b) Ammoniacal $AgNO_3$ c) Aq. $KMnO_4$ d) Dil. H_2SO_4

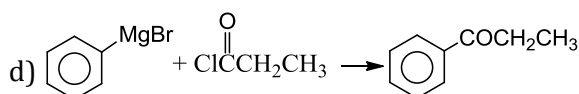
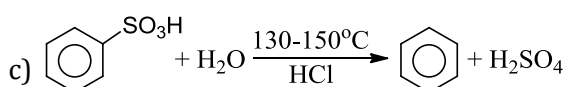
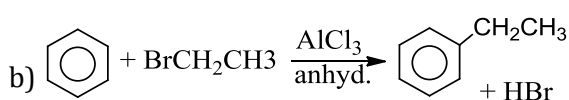
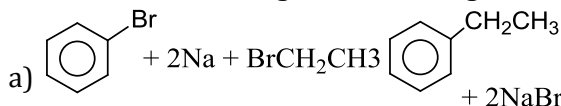
142. The reaction of ethene with oxygen in presence of a silver catalyst gives:

- a) Ethylene glycol b) Ethylene epoxide c) Glyoxal d) Acetaldehyde

143. 4-nitrotoluene $\xrightarrow[H_2SO_4]{K_2Cr_2O_7}$ product. The product in the reaction is

- a) Benzoic acid b) 4-nitrobenzene c) 4-nitrobenzoic acid d) 2-nitrobenzoic acid

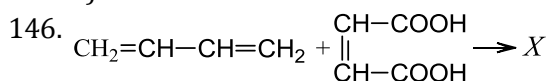
144. Which of the following is Wurtz-Fittig reaction?



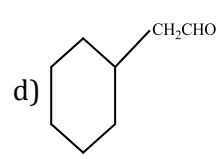
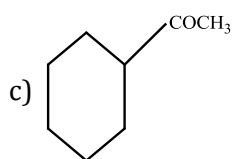
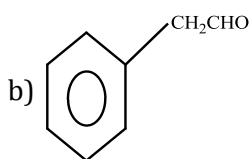
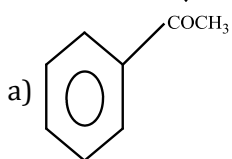
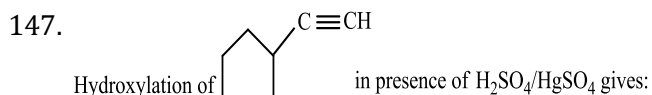
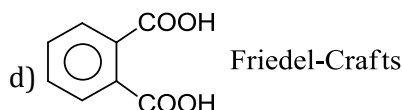
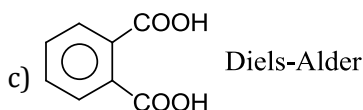
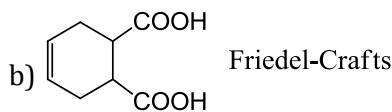
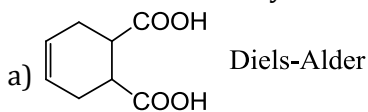
145. Ozonolysis can be used to detect:

- a) 1-butene and 2-butene
b) Branched alkene from unbranched alkene
c) Location of double bond/triple bond in carbon chain

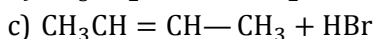
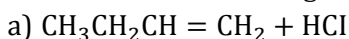
d) All are correct



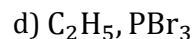
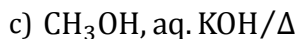
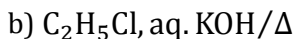
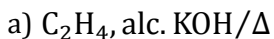
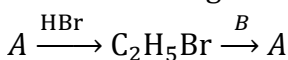
Product X is obtained by reaction R . X and R are



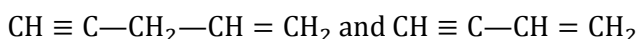
148. In which of the following will Kharasch effect operate?



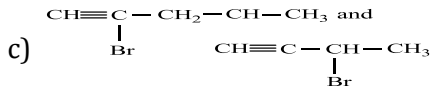
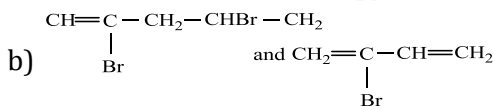
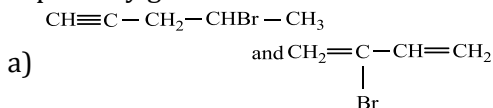
149. In the following reaction, A and B , respectively are



150. Addition of HBr on:



Separately gives:



d) None of the above

151. Compound C_6H_{12} is an:

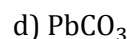
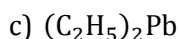
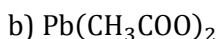
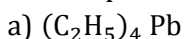
a) Aliphatic saturated compound

b) Alicyclic compound

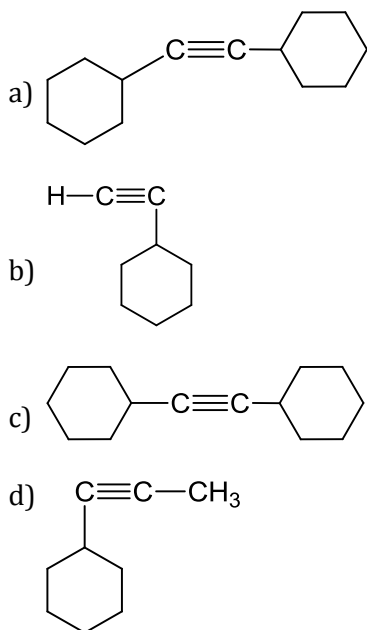
c) Aromatic compound

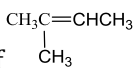
d) Heterocyclic compound

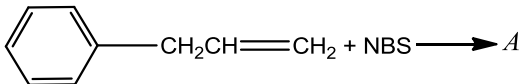
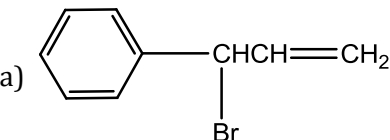
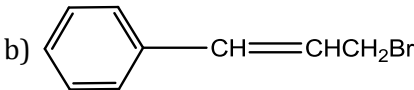
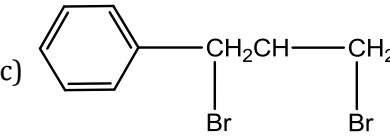
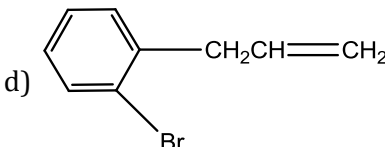
152. A lead compound known as....is used as anti-knock in petroleum industry to increase the efficiency of fuel consumption



153. Which of the following form alkynide?



154. Which of the following reagents when heated with ethyl chloride, forms ethylene?
 a) Aqueous KOH b) Zn/HCl c) Alcoholic KOH d) HI
155. Reduction of 2-methyl-1-bromopropane with metal and acid gives:
 a) Butyl bromide b) *n*-butane c) Isobutene d) None of these
156. Dehydration of 2-butanol yield
 a) 1-butene b) 2-butene c) 2-butyne d) Both (a) and (b)
157. Which statement is correct?
 a) Knocking decreases the efficiency of an internal combustion engine
 b) Knocking cannot be eliminated completely by adding anti-knock compounds
 c) The higher the octane number, the better is the quality of fuel
 d) All of the above
158. The treatment of  with NaIO₄ or boiling KMnO₄ produces
 KMnO₄ produces
 a) CH₃COCH₃ + CH₃COOH b) CH₃COCH₃ + CH₃CHO
 c) CH₃CHO + CO₂ d) CH₃COCH₃ only
159. Which of the following reagents will be able to distinguish between 1-butyne and 2-butyne?
 a) NaNH₂ b) HCl c) O₂ d) Br₂
160. 2-chloro-3-methylbutane is treated with sodium in etheral solution, then it will give
 a) 2,4-dimethylhexane b) 3,5-dimethylhexane
 c) 2,3,4,5-tetramethylhexane d) 2,6-dimethyloctane
161. The hydrocarbon which can react with sodium in liquid ammonia is
 a) CH₃CH₂CH₂C ≡ CCH₂CH₂CH₃ b) CH₃CH₂C ≡ CH
 c) CH₃CH = CHCH₃ d) CH₃CH₂C ≡ CCH₂CH₃
162. Which of the following is incorrect? The members of the homologous series of alkanes?
 a) Are all straight chain compounds
 b) Have the general formula C_nH_{2n+2}
 c) Show a regular gradation in physical properties
 d) Have similar chemical properties
163. Ammoniacal cuprous chloride will give red precipitate with which one of the following?
 a) CH₃ - C ≡ C - CH₃ b) CH₃ - CH = CH₂
 c) CH₃ - C ≡ CH d) CH₃ - CH = CH - CH₃
164. Mustard gas is:

- a) CH_4 b) C_2H_4 c) $\text{CH}_2\text{Cl}-\text{CH}_2-\text{S}-\text{CH}_2$ -d) None of the above
165. During pyrolysis of alkane, C—C bond rather than C—H bond break because:
 a) C—C bond is reactive site in alkane
 b) C—H bond is reactive site in alkane
 c) Bond energy of C—C is lower than C—H bond
 d) Energy of activation of C—C bond is very high
166. A mixture of CH_4 and steam on passing over nickel suspension on alumina at 800°C gives:
 a) CO only b) H_2 only c) CO and H_2 d) None of these
167. A compound $X(\text{C}_5\text{H}_8)$ reacts with ammoniacal AgNO_3 to give a white precipitate, and on oxidation with hot alkaline KMnO_4 gives the acid, $(\text{CH}_3)_2\text{CHCOOH}$. Therefore, X is
 a) $\text{CH}_2 = \text{CHCH} = \text{CHCH}_3$ b) $\text{CH}_3(\text{CH}_2)_2\text{C} \equiv \text{CH}$ c) $(\text{CH}_3)_2\text{CH}-\text{C} \equiv \text{CH}$ d) $(\text{CH}_3)_2\text{C} = \text{C} = \text{CH}_2$
168. What are the products obtained by the ozonolysis of $\text{RCH} = \text{CR}_1\text{R}_2$?
 a) $\text{R}_1\text{CH}_2\text{CH}_2\text{R}_2$ b) R_2CO c) R_1COR_2 d) None of these
169. Following compound is treated with NBS
- 
- Compound formed A is
- a) 
- b) 
- c) 
- d) 
170. The structural formula of the compound which yields ethylene upon reaction with zinc:
 a) $\text{CH}_2\text{Br}-\text{CH}_2\text{Br}$ b) $\text{CHBr}_2-\text{CHBr}_2$ c) $\text{CHBr}=\text{CHBr}$ d) None of these
171. An alkyne combines with a conjugated diene to give an unconjugated cycloalkadiene. The most likely title of this reaction is
 a) Schotten-Baumann reaction b) Hofmann-bromamide reaction
 c) Pinacol-Pinacolone rearrangement d) Diels-Alder reaction
172. The most important method of preparation of hydrocarbons of lower carbon number is:
 a) Pyrolysis of higher carbon number hydrocarbons
 b) Electrolysis of salts of fatty acids
 c) Sabatier-Senderen's reaction
 d) Direct synthesis
173. The number of carbon atoms in hydrocarbons of kerosene is in the range of:
 a) C_5-C_7 b) $\text{C}_{12}-\text{C}_{16}$ c) C_1-C_4 d) $\text{C}_{17}-\text{C}_{20}$
174. A mixture of 1-chlorobutane and 2-chlorobutane when treated with alcoholic KOH gives
 a) 1-butene b) 2-butene
 c) *iso*-butylene d) Mixture of 1-butene+2-butene
175. Which of the following react with Cl_2 and Br_2 at room temperature and in the absence of diffused sunlight to produce dihalogen derivatives?
 a) Cyclobutane b) Cyclopentane c) Cyclohexane d) All of these
176. A compound (X) on ozonolysis followed by reduction gives an aldehyde $\text{C}_2\text{H}_4\text{O}$ and 2-butanone, compound (X) is
 a) 3-methyl pentene-2 b) 3-methyl pentene-3 c) 3-methyl hexene-3 d) 3-ethyl pentene-3
177. An octane number 100 is given to:
 a) *n*-hexane b) *Iso*-octane c) Neopentane d) Neo-octane

178. When butene-1 is mixed with HBr, the major reaction product is:

- a) 1,2-dibromobutane b) 1-bromobutane c) 2-bromobutane d) None of these

179. Which cycloalkane has the lowest heat of combustion per CH_2 group?

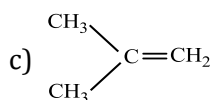
- a) Cyclopropane b) Cyclobutane c) Cyclopentane d) Cyclohexane

180. The order of appearance of the following with rising temperature during the refining of crude oil is:

- a) Kerosene, gasoline, diesel
b) Diesel, gasoline, kerosene
c) Gasoline, diesel, kerosene
d) Gasoline, kerosene, diesel

181. $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_3 \xrightarrow{\text{NaNH}_2} X$; what is X ?

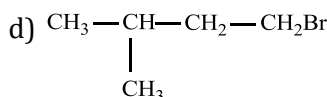
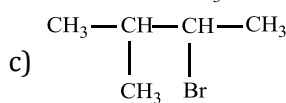
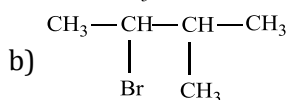
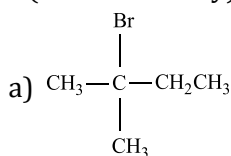
- a) $\text{CH}_3-\text{CH}_2\text{CH}_2\text{CH}_3$ b) $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$



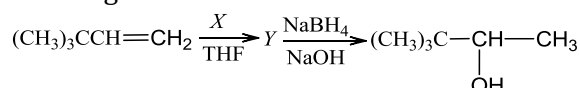
- d) $\text{CH}_2=\text{C}=\text{CH}-\text{CH}_3$

182. $\text{H}_3\text{C}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}=\text{CH}_2 + \text{HBr} \longrightarrow A$

A (Predominantly) is:



183. The reagent X in the reactions



- a) H_3O^+ b) $(\text{CH}_3\text{COO})_2\text{Hg}$ c) OH^- d) HCOOH

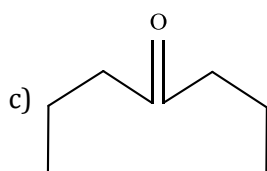
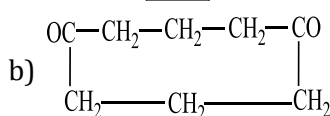
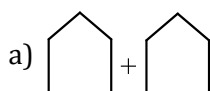
184. Cetane number of diesel fuel increases with the addition of:

- a) Decane b) Hexadecane c) Pentane d) Methyl naphthalene

185. Distillation of acetone with concentrated sulphuric acid gives

- a) Diacetone alcohol b) Mesityl oxide c) Mesitylene d) Propene-2-ol

186. Ozonolysis of will give:



d) None of the above

187. Soda lime is used extensively in decarboxylation reaction to obtain alkanes. Soda lime is:

- a) NaOH b) NaOH and CaO c) CaO d) Na_2CO_3

188. Incomplete combustion of petrol or diesel oil in automobile engines can be best detected by testing fuel gases for the presence of:

- a) Carbon dioxide and water vapour
b) Carbon monoxide
c) Nitrogen oxide
d) Sulphur dioxide

189. A compound with molecular formula C_4H_6 may contain:

- a) A double bond
b) Two triple bonds
c) All single bonds
d) Two double bonds or a triple bond

190. Mustard gas is a

- a) Oil gas b) Poisonous gas c) Fuel gas d) Life gas

191. Which of the following is not true?

- a) Acetylene has a linear structure
b) Alkynes undergo electrophilic addition, but not nucleophilic addition reactions
c) Alkenes show geometrical isomerism
d) There is sp^3 -hybridisation in propane

192. Pure CH_4 can be obtained by:

- a) $\text{CH}_3\text{COONa} + \text{BaO}$ b) $\text{HCOONa} + \text{NaOH}$ c) $\text{CH}_3\text{COONa} + \text{Sodalime}$ d) Electrolysis of HCOONa(aq.)

193. Viscosity coefficients of some liquids are given below,

Liquid	η in millipoise at 30°C
$\text{CH}_3(\text{CH}_2)_3\text{CH}_3$	2.11
$\text{CH}_3(\text{CH}_2)_4\text{CH}_3$	2.89
$\text{CH}_3(\text{CH}_2)_5\text{CH}_3$	3.68

The order of viscosity coefficient of the liquids,

(A) $\text{CH}_3\text{—CH}_2\text{—CH}_2\text{—CH}_2\text{—CH}_2\text{—CH}_3$

(B) $\text{CH}_3\text{—CH}_2\text{—CH(CH}_3\text{)—CH}_2\text{—CH}_3$

(C) $\text{CH}_3\text{—CH(CH}_3\text{)—CH(CH}_3\text{)—CH}_3$

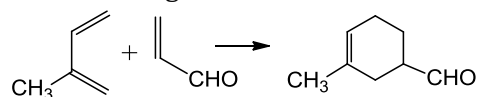
is:

- a) The same b) $(A) > (B) > (C)$ c) $(A) < (B) < (C)$ d) $(A) > (B) = (C)$

194. Action of RMg X with vinyl chloride gives:

- a) Alkane b) Alkyne c) Alkene d) All of these

195. The following reaction is called



- a) Michael addition reaction b) Diels-alder reaction
c) Wolff-Kishner reaction d) None of the above

196. Which branched chain isomer of the hydrocarbon with molecular mass 72u gives only one isomer of mono

substituted alkyl halide?

- a) Neopentane
- b) Isohexane
- c) Neohexane
- d) *Tertiary*-butyl chloride

197. A *meta* directing functional group is

- a) $-\text{COOH}$
- b) $-\text{OH}$
- c) $-\text{CH}_3$
- d) $-\text{Br}$

198. Which one of the following compounds is prepared in the laboratory from benzene by a substitution reaction?

- a) Glyoxal
- b) Cyclohexane
- c) Acetophenone
- d) Hexabromocyclohexane

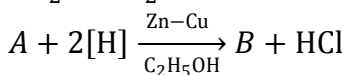
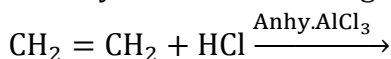
199. Only two isomeric monochloro derivatives are possible for:

- a) *n*-pentane
- b) 2,4-dimethylpentane
- c) Benzene
- d) 2-methylpropane

200. Butene-1 may be converted to butane by reaction with

- a) $\text{Zn} - \text{HCl}$
- b) $\text{Sn} - \text{HCl}$
- c) $\text{Zn} - \text{Hg}$
- d) Pd/H_2

201. Identify '*B*' in the following reaction,



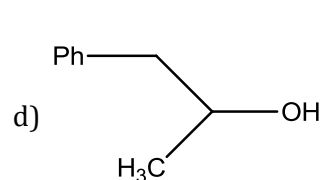
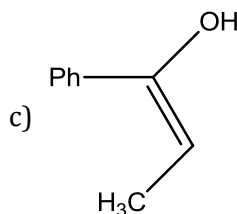
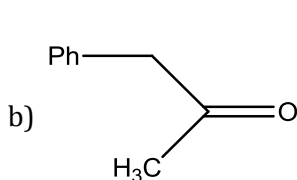
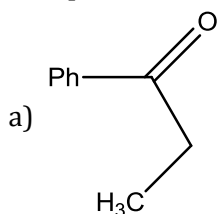
- a) CH_4
- b) C_2H_6
- c) $\text{C}_2\text{H}_5\text{Cl}$
- d) $\text{C}_2\text{H}_5\text{OH}$

202. The reaction of toluene with chlorine in presence of ferric chloride gives predominantly

- a) benzoyl chloride
- b) *m*-chlorotoluene
- c) Benzyl chloride
- d) *o*- and *p*-chlorotoluene

203. $\text{Ph} - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow{\text{Hg}^{2+}/\text{H}^+} A$

The product *A* is



204. During Wurtz reaction, which of the following is sometimes also obtained because of decomposition of free radicals?

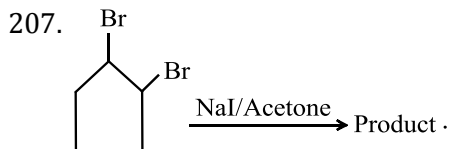
- a) Alkynes
- b) Alkenes
- c) CO_2
- d) Alkyl halide

205. Which of the following reagents cannot be used to locate the position of triple bond in $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$?

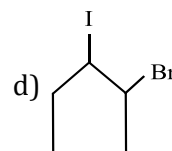
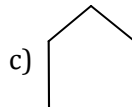
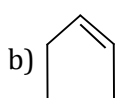
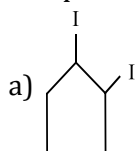
- a) Br_2
- b) O_3
- c) Cu^+
- d) KMnO_4

206. Decarboxylation of malonic acid gives:

- a) CH_4
- b) C_2H_6
- c) C_3H_8
- d) None of these

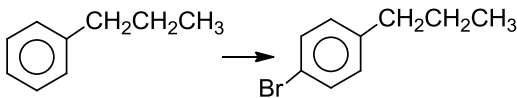


The product of reaction is:



208. Which compound will react with an aqueous solution of $\text{Ag}(\text{NH}_3)_2^+ \text{OH}^-$?

- a) $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$
- b) $\text{CH}_3\text{CH}_2\text{C} \equiv \text{CH}$
- c) $\text{CH}_3 - \text{CH}_3$
- d) $\text{CH}_2 = \text{CH}_2$

209. Reactivity of tertiary H, secondary H and primary H towards elimination is:
 a) Tert. > sec. > pri. b) Sec. > tert. > pri c) Sec. > pri. > tert. d) Pri. > sec. > tert.
210. 1-butyne on hydration gives
 a) Butyn-1, 2-diol b) Butan-1-ol c) Butan-2-ol d) Butan-2-one
211. The hydration of propyne in the presence of $\text{HgSO}_4/\text{H}_2\text{SO}_4$ produces
 a) HCHO b) CH_3CHO c) $\text{CH}_3\text{CH}_2\text{CHO}$ d) CH_3COCH_3
212. The most reactive halogen in the halogenation of alkanes is:
 a) Cl_2 b) Br_2 c) I_2 d) All are equal
213. A gas decolourised by KMnO_4 solution but gives no precipitate with ammoniacal cuprous chloride is
 a) Ethane b) Methane c) Ethene d) Acetylene
214. Indane is:
 a) Commercial propane
 b) Commercial isobutene and propane mixture
 c) Methane, propane mixture
 d) Butane, ethane mixture
215. Which reacts with ammoniacal AgNO_3 ?
 a) Propyne b) 2-butyne c) 1,3-butadiene d) Pentene
216. The conversion

 Can be effected using
 a) Br_2/CCl_4 b) $\text{Br}_2/\text{H}_2\text{O}$
 c) Br_2/Fe d) $\text{Br}/\text{benzoyl peroxide}$
217. Which of the following cycloalkane gives open chain compound, when reacts with bromine?
 a) Cyclopropane b) Cyclopentane c) Cyclohexane d) Cyclooctane
218. The addition of HBr to an alkene in the presence of peroxide is the example of
 a) Electrophilic addition reaction
 b) nucleophilic addition reaction
 c) Free radical addition reaction
 d) The formation of carbocation as an intermediate
219. On mixing a certain alkane with chlorine and irradiating it with UV light, it form one monochloro alkane.
 The alkane could be
 a) Neopentane b) Propane c) Pentane d) Isopentane
220. Which of the following statements is true for ethane, ethene and acetylene?
 a) Acetylene is the weakest acid and has the longest C – H bond distance
 b) Acetylene is the strongest acid and has the shortest C – H bond distance
 c) Ethane is the strongest acid and has the longest C – H bond distance
 d) Ethene is the strongest acid and has the shortest C – H bond distance
221. On cracking petrol we get:
 a) CH_4
 b) C_3H_6
 c) Both of the above
 d) $\text{CH}_3 + \text{CH}_4 + \text{C}_2\text{H}_6 + \text{alcohols}$
222. Methyl bromide is converted into ethane by heating it in ether medium with
 a) Al b) Zn c) Na d) Cu
223. The addition of oxygen gas to reaction mixture of chlorine and methane (photochemical chlorination):
 a) Accelerates the reaction
 b) Retards the reaction for sometime

- c) Has no effect on the rate of reaction
 d) May accelerate or retard the reaction depending upon the amount of oxygen
224. Order of reactivity of C_2H_6 , C_2H_4 and C_2H_2 is
 a) $C_2H_6 > C_2H_4 > C_2H_2$
 b) $C_2H_2 > C_2H_6 > C_2H_4$
 c) $C_2H_4 > C_2H_2 > C_2H_6$
 d) All are equally reactive
225. Bacterial decomposition of cellulose material present in sewage water gives:
 a) H_2
 b) CH_4
 c) O_2
 d) N_2
226. The reaction, $CH_3Br + Na \rightarrow \text{Product}$, is called
 a) Perkin reaction
 b) Levit reaction
 c) Wurtz reaction
 d) Aldol condensation
227. *Meso*-dibromobutane on debromination gives
 a) *trans*-2-butene
 b) *cis*-2-butene
 c) 1-butene
 d) 1-butyne
228. $CH \equiv CH + HBr \rightarrow X$, product X is
 a) Ethylene bromide
 b) Vinyl bromide
 c) Bromo ethane
 d) Ethyldine bromide
229. Kolbe's synthesis of sodium salt of butanoic acid gives:
 a) *n*-hexane
 b) Isobutane
 c) Butane-1
 d) Ethylene
230. The compound formed when silver powder is heated with chloroform:
 a) CH_4
 b) C_2H_2
 c) C_2H_4
 d) C_2H_6
231. The reaction of toluene with chlorine in the presence of ferric chloride gives predominantly
 a) *m*-chlorotoluene
 b) Benzyl chloride
 c) Benzoyl chloride
 d) *o* and *p*-chlorotoluene
232. Which of the following will yield *trans* product from butyne?
 a) $LiAlH_4$
 b) $Na/Liq. NH_3$
 c) $NaBH_4$
 d) Ni catalyst
233. A hydrocarbon of molecular formula C_6H_{10} reacts with sodamide and the same on ozonolysis followed by hydrogen peroxide oxidation gives two molecules of carboxylic acids, one being optically active. Then, the hydrocarbon may be
 a) 1-hexyne
 b) 3-hexyne
 c) 3-methyl-1-pentyne
 d) 3,3-dimethyl-1-butyne
234. Which of the following is not correct about the reaction,
 $CH_2 = CH_2 + Br_2 \xrightarrow{NaI(aq)} ?$
 a) The products formed are CH_2BrCH_2Br and CH_2BrCH_2I
 b) The reaction follows polar mechanism
 c) The reaction occurs readily in solution and is catalysed by inorganic halides
 d) CH_2ICH_2I is formed only
235. During ozonolysis of $CH_2 = CH_2$ if hydrolysis is made in absence of Zn dust the products formed are:
 a) $HCHO$
 b) $HCOOH$
 c) CH_3OH
 d) CH_2OHCH_2OH
236. The formation of butane on heating C_2H_5I with Na in presence of ether is contaminated with impurities of:
 a) C_2H_4
 b) C_3H_6
 c) CH_4
 d) None of these
237. When sodium propionate is heated with soda-lime, the product formed is
 a) Methane
 b) Ethane
 c) Ethene
 d) Ethyne
238. Isopropyl bromide on Wurtz reaction gives
 a) Hexane
 b) Propane
 c) 2,3-dimethyl butane
 d) *neo*-hexane
239. Which one of the following has the minimum boiling point?
 a) *n*-butane
 b) 1-butyne
 c) 1-butene
 d) *Iso*-butene
240. The substance that would not at all be formed during the reaction of methane and chlorine in the presence of sunlight is:
 a) CH_3Cl
 b) $CHCl_3$
 c) CH_3CH_3
 d) $CH_3CH_2CH_3$

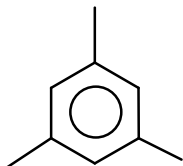
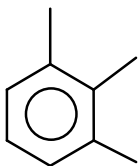
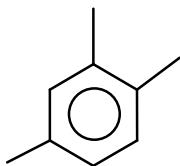
241. When isopropyl magnesium iodide is treated with water, the product is:

- a) Propane b) *n*-butane c) Isobutene d) Isobutyl alcohol

242. The monosodium salt of acetylene on treating with dry CO₂ forms:

- a) CH \equiv CCOOH b) CH \equiv CCOONa c) CH \equiv CCONa d) None of these

243. Propyne on passing through red hot iron tube gives

- a)  b)  c)  d) None of these

244. (CH₃)₃CMgCl on reaction with D₂O produces

- a) (CH₃)₃COD b) (CD₃)₃CH c) (CH₃)₃CD d) (CD₃)₃CD

245. *n*-hexadecane (cetane) has cetane number:

- a) 100 b) Zero c) 90 d) 110

246. Acetylene does not react with

- a) Na b) ammoniacal AgNO₃ c) HCl d) NaOH

247. What volume of CH₄ at NTP is formed when 20.5 g of CH₃COONa is treated with sodalime?

- a) 4.4 litre b) 2.2 litre c) 3.2 litre d) 5.6 litre

248. The hydrocarbon which decolourizes alkaline KMnO₄ solution, but does not give any precipitate with ammoniacal silver nitrate is:

- a) Benzene b) Acetylene c) Propyne d) Butyne-2

249. What is the molecular formula of the product formed when benzene is reacted with ethyl chloride in presence of anhydrous aluminium chloride?

- a) C₈H₁₀ b) C₆H₆ c) C₈H₈ d) C₆H₅Cl

250. Which will give CH₂ = C = CH₂?

- a) CH₂Br—CBr = CH₂ $\xrightarrow{\text{Zn/CH}_3\text{OH}}$
 b) CH \equiv C—CH₂—COOH $\xrightarrow{\text{K}_2\text{CO}_3(aq)}$
 c) 2CH₂ = CH—CH₂I $\xrightarrow{2\text{Na}}$
 d) None of the above

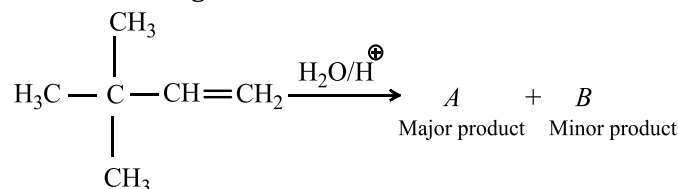
251. A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is

- a) 1,1-dibromopropane b) 2,2-dibromopropane
 c) 1,2-dibromoethane d) 1,4-dibromobutane

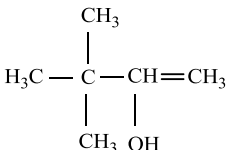
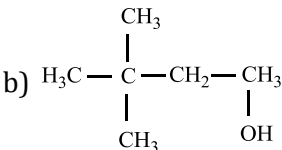
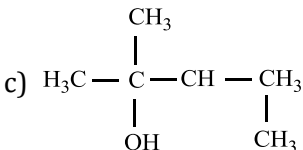
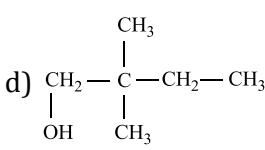
252. By coaltar distillation which is not obtained?

- a) Light oil b) Middle oil c) Heavy oil d) Mobil oil

253. In the following reaction:



The major product is:

- a)  b)  c)  d) 

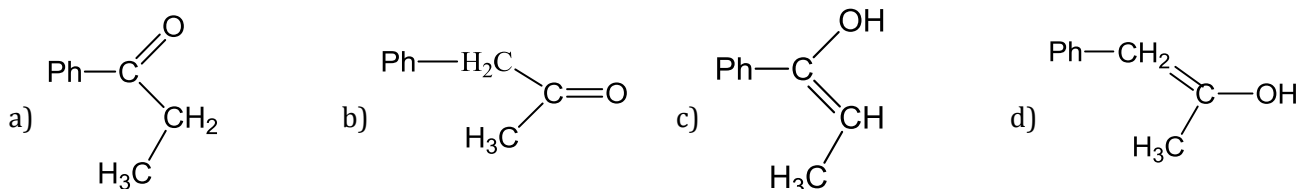
254. The treatment of ethane with cold alkaline potassium permanganate produces

- a) Ethylene glycol b) Formaldehyde
 c) Formic acid d) Carbon dioxide and water

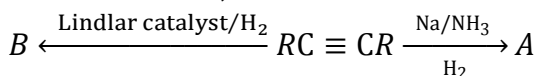
255. As compared to melting points of even carbon chain isomers, the melting points of odd carbon chain alkanes are:

- a) Lower
- b) Higher
- c) Same
- d) Not depend upon branching

256. $\text{Ph} - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow{\text{Hg}^{2+}/\text{H}^+} \text{A}$,



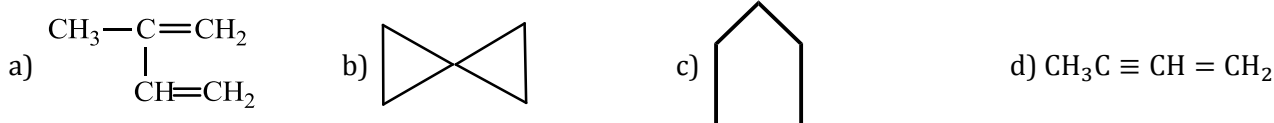
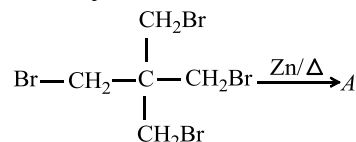
257. In the reactions,



A and B are geometrical isomers. Then,

- a) A is *cis* and B is *trans*
- b) A is *trans* and B is *cis*
- c) A and B are *cis*
- d) A and B are *trans*

258. Identify 'A' in the reaction:



259. Choose the correct statement

- a) Acetylene is more reactive than ethylene to an electrophilic attack
- b) Acetylene and ethylene show similar reactivities towards an electrophilic attack with different rates
- c) The reactivities of acetylene and ethylene towards an electrophilic attack depend on the electrophilic reagent
- d) Acetylene is less reactive than ethylene to an electrophilic attack

260. $\text{C}_6\text{H}_5\text{CH}_3 \xrightarrow{\text{CrO}_2\text{Cl}_2} \text{Z}$

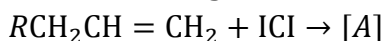
In the given sequence, Z is

- a) Benzaldehyde
- b) Toluic acid
- c) Phenyl acetic acid
- d) Benzoic acid

261. 2-hexyne can be converted to *trans*-2-hexene by the action of:

- a) $\text{H}_2 - \text{Pd}/\text{BaSO}_4$
- b) $\text{Li}/\text{Liq. NH}_3$
- c) $\text{H}_2 - \text{Pt O}_2$
- d) NaBH_4

262. In the following reaction,

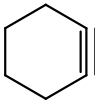
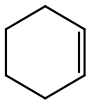
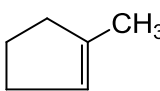
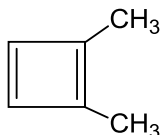


Markownikoff's product [A] is



263. Which of the following will not produce ethane?

- a) Reduction of CH_3COOH with HI and red P
 b) Reduction of CH_3COCH_3 with HI and red P
 c) Sodalime decarboxylation of sodium probionate
 d) Hydrogenation of ethane in presence of Raney-Ni
264. Which will not react with acetylene?
 a) NaOH b) Na c) HCl d) Amm. AgNO_3
265. Ozonolysis of an organic compounds gives formaldehyde as one of the products. This confirms the presence of
 a) Two ethylenic double bonds b) A vinyl group
 c) An *iso*-propyl group d) An acetylenic triple bond
266. Among the paraffins it is generally found that with an increase in the molecular weight:
 a) The freezing point decreases
 b) The boiling point decreases
 c) The boiling point increases
 d) The vapour density decreases
267. Which of the following reactions can be used to prepare methane?
 a) Clemmensen reduction
 b) Wurtz reaction
 c) Reduction of $\text{CH}_2 = \text{CH}_2$ by LiAlH_4
 d) Reduction of methyl iodine by using a zinc-copper couple
268. Ethylene reacts with dil. H_2SO_4 in presence of HgSO_4 to give:
 a) Ethanal b) Ethanol c) Ethane d) Ethene
269. Household gas or liquefied petroleum gas (L.P.G.) mainly contains:
 a) Methane and ethane
 b) Liquefied butane and isobutene
 c) Ethylene and CO
 d) C_2H_2 and H_2
270. Which one of the following gives, on ozonolysis, both aldehydes and ketones?
 a) $\text{Me}_2\text{C} = \text{CHMe}$ b) $\text{Me}_2\text{C} = \text{CMe}_2$
 c) $\text{MeCH}_2 - \text{C}(\text{Me}) = \text{CMe}_2$ d) $\text{MeCH}(\text{Me}) - \text{CH} = \text{CHMe}$
271. Which among the following give alkanes on reduction?
 a) Aldehydes b) Ketones c) Carboxylic acids d) All are correct
272. Lewisite (a war gas) is an.....compound.
 a) Organosulphur b) Organoarsenic c) Organoantimony d) Organophosphorus
273. In the following reaction,

$$\text{C}_2\text{H}_2 \xrightarrow[\text{HgSO}_4/\text{H}_2\text{SO}_4]{\text{H}_2\text{O}} \text{X} \rightleftharpoons \text{CH}_3\text{CHO} . \text{ What is X?}$$
 a) $\text{CH}_3\text{CH}_2\text{OH}$ b) $\text{CH}_3 - \text{O} - \text{CH}_3$ c) $\text{CH}_3\text{CH}_2\text{CHO}$ d) $\text{CH}_2 = \text{CHOH}$
274. Compound (A) on oxidation with $\text{OsO}_4/\text{NaIO}_4$ gives Hexanedinal. Structure of compound. (A) will be
- a)  b)  c)  d) 
275. Major product of the following reaction is:

$$\begin{array}{c} \text{Br} \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{CH}_3 + \text{Alc.KOH} \longrightarrow ? \\ | \\ \text{H} \end{array}$$
 a) Butene-1 b) Butene-2 c) Butane d) Butyne-1
276. The compound formed as a result of oxidation of ethyl benzene by KMnO_4 is

- a) Benzophenone b) Acetophenone c) Benzoic acid d) Benzyl alcohol
277. Methane reacts with conc. HNO_3 at high temperature to yield:
a) CO_2 and H_2O b) HCHO c) HCOOH d) CH_3NO_2
278. Butyne-1 and butyne-2 can be distinguished by:
a) $\text{Br}_2, \text{CCl}_4$
b) H_2 , Lindler catalyst
c) Dilute $\text{H}_2\text{SO}_4, \text{HgSO}_4$
d) Ammoniacal cuprous chloride
279. An isolated alkadiene is:
a) Penta-1,4-diene b) Penta-1,3-diene c) Penta-1,2-diene d) None of these
280. $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow{\text{Lindlar's catalyst}} \text{A}$, the compound A is
a) *cis*-2-butene b) *trans*-2-butene c) *iso*-butene d) 1-butene
281. If a halogen compound contains OH group, will it be possible to carry out the Wurtz reaction?
a) Yes b) No c) - d) -
282. Reduction of 2-butyne with Na in liquid NH_3 gives predominantly:
a) *n*-butane b) *Trans*-2-butene c) No reaction d) *Cis*-2-butene
283. Phenyl magnesium bromide reacts with methanol to give
a) A mixture of anisole and $\text{Mg}(\text{OH})\text{Br}$ b) A mixture of benzene and $\text{Mg}(\text{OMe})\text{Br}$
c) A mixture of toluene and $\text{Mg}(\text{OH})\text{Br}$ d) A mixture of phenol and $\text{Mg}(\text{Me})\text{Br}$
284. Iso-octane is added to petrol:
a) To precipitate inorganic material
b) To prevent freezing of petrol
c) To increase the boiling point of petrol
d) To increase octane number
285. When cyclohexane is poured on water, it floats, because:
a) Cyclohexane is in 'boat' form
b) Cyclohexane is in 'chair' form
c) Cyclohexane is in 'crown' form
d) Cyclohexane is less dense than water
286. Ethylene reacts with 1% cold alkaline KMnO_4 (Baeyer's reagent) to form:
a) Oxalic acid b) Acetic acid c) Glycerol d) Glycol
287. The reagent that would effect the following transformation is:
 $\text{C}_6\text{H}_5 - \text{CH} = \text{CH} - \text{NO}_2 \rightarrow \text{C}_6\text{H}_5\text{CH}_2 - \text{CH}_2 - \text{NO}_2$
a) NaBH_4 in alcohol b) $[(\text{C}_6\text{H}_5)_3\text{P}]_3\text{RhCl}/\text{H}_2$ c) LiAlH_4 d) All of these
288. How many primary and tertiary carbon atoms are present in
$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array} ?$$

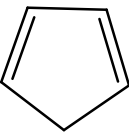
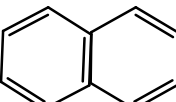
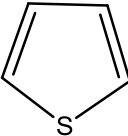
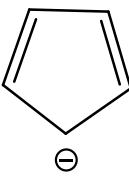
a) 3p, 1t b) 2p, 2t c) 1p, 3t d) None of these
289. Which of these will not react with acetylene?
a) NaOH b) Aqueous AgNO_3 c) Na d) HCl
290. The catalytic hydrogenation is more easier in case of which alkene?
a) $\begin{array}{c} R \\ \diagdown \\ \text{C} = \text{CH}_2 \\ \diagup \\ R \end{array}$ b) $\begin{array}{c} R & & R \\ \diagdown & & \diagup \\ & \text{C} = \text{C} & \\ \diagup & & \diagdown \\ \text{H} & & \text{H} \end{array}$ c) $\begin{array}{c} R & & R \\ \diagdown & & \diagup \\ & \text{C} = \text{C} & \\ \diagup & & \diagdown \\ R & & \text{H} \end{array}$ d) $\begin{array}{c} R & & R \\ \diagdown & & \diagup \\ & \text{C} = \text{C} & \\ \diagup & & \diagdown \\ R & & R \end{array}$
291. Addition of hydrogen on $\text{C}=\text{C}$ is called hydrogenation. Addition of halogen on $\text{C}=\text{C}$ is called:
a) Halogenation
b) Dehalogenation
c) Elimination of halogen
d) None of these

292. The synthetic gas is:
 a) CH_4 b) C_2H_2 c) $\text{CO} + 3\text{H}_2$ d) NH_3
293. Toluene on treatment with CrO_3 and $(\text{CH}_3\text{CO})_2\text{O}$ followed by hydrolysis with dil. HCl gives
 a) Benzaldehyde b) Benzoic acid c) Phenol d) Phenylacetaldehyde
294. Identify the product (P) in the reaction:

$$\text{R}_3\text{C}-\text{H} \xrightarrow{\text{Alk. KMnO}_4} \text{P}$$

 a) No reaction b) $\text{R}_3\text{C}-\text{CR}_3$ c) $\text{R}_3\text{C}-\text{OH}$ d) $\text{R}_3\text{C}-\text{O}-\text{CR}_3$
295. Gem dihalides on treatment with alcoholic KOH give
 a) Alkyne b) Alkene c) Alkane d) All of these
296. The presence of Ag^+ ion increases the solubility of alkenes due to the formation of
 a) $d\pi - d\sigma$ bonding b) $p\sigma - p\pi$ bonding c) $p\pi - d\pi$ bonding d) $p\pi - d\sigma$ bonding
297. Acetylene and HCHO react in presence of copper acetylide catalyst to form
 a) 1-butyne-1,4-diol b) 2-butyne-1,2-diol c) 2-butyne-1,4-diol d) None of these
298. Decarboxylation of isobutyric acid leads to:
 a) Isobutene b) Propane c) Butane d) None of these
299. In the addition of HBr to propene in the absence of peroxides the first step involves the addition of:
 a) H^+ b) Br^- c) H° d) Br
300. The IUPAC name of $-\text{C} \equiv \text{C}-\text{CH}_3$ group is:
 a) Prop-2-ynyl b) Prop-2-enyl c) Prop-1-ynyl d) None of these
301. Pure methane can be produced by
 a) Wurtz reaction b) Kolbe's electrolytic method
 c) Soda lime decarboxylation d) reduction with H_2
302. What are X and Y respectively, in the following reaction?

$$\text{Z} - \text{product} \xleftarrow{\text{Y}} 2 - \text{butyne} \xrightarrow{\text{X}} \text{E} - \text{product}$$

 a) $\text{Na}/\text{NH}_3(\text{liq.})$ and $\text{Pd}/\text{BaSO}_4 + \text{H}_2$ b) $\text{Ni}/140^\circ\text{C}$ and $\text{Pd}/\text{BaSO}_4 + \text{H}_2$
 c) $\text{Ni}/140^\circ\text{C}$ and $\text{Na}/\text{NH}_3(\text{liq.})$ d) $\text{Pd}/\text{BaSO}_4 + \text{H}_2$ and $\text{Na}/\text{NH}_3(\text{liq.})$
303. When a mixture of methane and oxygen is passed through heated molybdenum oxide, the main product formed is
 a) Methanoic acid b) Ethanal c) Methanol d) Methanal
304. Propyne and propene can be distinguished by
 a) conc. H_2SO_4 b) Br_2 in CCl_4 c) alk. KMnO_4 d) AgNO_3 in NH_3
305. Conformation in molecules is due to:
 a) Rotation about a single bond
 b) Change in direction of light
 c) Structural changes
 d) Restricted rotation about a double bond
306. The non-aromatic compound among the following is
 a)  b)  c)  d) 
307. Kerosene is a mixture of:
 a) Alkenes b) Alkanes c) Alkynes d) Arenes
308. Which of the following alkenes is most stable?
 a) $\text{R}_2\text{C} = \text{CR}_2$ b) $\text{R}-\text{CH} = \text{CH}-\text{R}$ c) $\text{RCH} = \text{CH}_2$ d) $\text{CH}_2 = \text{CH}_2$
309. What is obtained when chlorine is passed in boiling toluene and product is hydrolysed?
 a) *o*-cresol b) *p*-cresol

- c) 2,4-dihydroxytoluene d) Benzyl alcohol
310. It is necessary to use.....in the iodination of alkane.
 a) Alcohol b) Oxidant c) Benzene d) Reductant
311. Ozonolysis of propyne gives:
 a) CH_3CHO b) CH_3COCHO c) HCHO d) CHOCHO-
312. Reactivity of alkenes towards HX decreases in the order:
 a) Butene>propene>ethene
 b) Butene>ethene>propene
 c) Ethene>propene>butene
 d) None of the above
313. Propyne on oxidation with SeO_2 gives:
 a) CHOCHO b) $\text{CH}_3\text{CH}_2\text{CHO}$ c) CH_3COCHO d) CHOCH_2CHO
314. 2-methylbutane on reacting with bromine in the presence of sunlight gives mainly
 a) 1-bromo 3-methylbutane b) 2-bromo 3-methylbutane
 c) 2-bromo 2-methylbutane d) 1-bromo 2-methylbutane
315. The product of following reaction is,
- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}=\text{CH}_2 \\ | \\ \text{CH}_3 \end{array} \xrightarrow[\text{(ii) NaBH}_4+\text{NaOH}]{\text{(i) Hg (CH}_3\text{COO)}_2;\text{THF}} ?$$
- a) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}-\text{CH}_3 \\ | \quad | \\ \text{CH}_3 \quad \text{OH} \end{array}$ b) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}_2-\text{CH}_2\text{OH} \\ | \\ \text{CH}_3 \end{array}$ c) $\begin{array}{c} \text{OH} \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3-\text{C}-\text{CH}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$ d) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{HOCH}_2-\text{C}-\text{CH}_2-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$
316. Which statement is correct?
 a) Alkanes are called paraffins because of their little chemical affinity
 b) Alkanes have only sigma bonds
 c) Most abundant alkane is CH_4
 d) All are correct
317. An activating group
 a) activates only *ortho* and *para* positions b) Deactivates *meta* position
 c) activates *ortho* and *para* more than *meta* d) Deactivates *meta* more than *ortho* and *para*
318. An alkyl bromide, RBr of molecular weight 151 is the exclusive product of bromination of which hydrocarbon?
 a) Dodecane b) 2, 2-dimethylpropane
 c) 2, 2-dimethylhexane d) 2, 2, 3-trimethylheptane
319. The conversion of liquid hydrocarbon into a mixture of gaseous compounds by heat alone is known as:
 a) Hydrolysis b) Reduction c) Oxidation d) Cracking
320. Ethyl benzene cannot be prepared by
 a) Wurtz reaction b) Wurtz-Fittig reaction
 c) Friedel-Craft's reaction d) Clemmensen reduction
321. Silver acetylide when heated with HCl gives:
 a) C_2H_2 b) H_2 c) C_2H_4 d) C_6H_6
322. The addition of HCl to 3, 3, 3-trichloropropene gives
 a) $\text{Cl}_3\text{CCH}_2\text{CH}_2\text{Cl}$ b) $\text{Cl}_3\text{CCH}_2\text{CHCl}_2$ c) $\text{Cl}_2\text{CHCH}_2\text{CHCl}_2$ d) $\text{Cl}_2\text{CHCH}(\text{Cl})\text{CH}_2\text{Cl}$
323. Sodium ethoxide is specific reagent for:
 a) Dehydration
 b) Dehydrohalogenation
 c) Dehydrogenation
 d) Dehalogenation

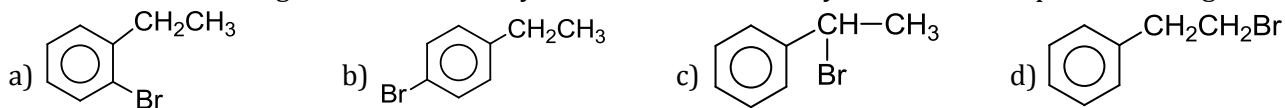
324. A fuel contains 25% *n*-heptane and 75% iso-octane. Its octane number is:

- a) 50 b) 75 c) 100 d) 25

325. The greatest strain is involved in cycloalkane, when the bond angle is:

- a) 60° b) 90° c) 120° d) 108°

326. Which of the following will be obtained by the bromination of ethylbenzene in the presence of light?



327. On passing electric discharge through graphite in presence of H₂ the compound formed is:

- a) CH₄ b) C₂H₆ c) C₂H₂ d) All of these

328. Propene reacts with Cl₂ at 400-600°C to give:

- a) 1,2-dichloropropane b) Allyl chloride c) No reaction d) Polyvinyl chloride

329. Methane reacts with oxygen at 100 atm and 300°C in presence of Cu to give:

- a) Acetaldehyde b) Methyl alcohol c) Acetic acid d) Ethyl alcohol

330. Ethylene is used in making:

- a) Anti-freeze b) Solvent c) Fumigant d) All of these

331. The main constituent of light oil fraction is:

- a) Benzene b) Toluene c) Phenol d) Naphthalene

332. The major product in the acid catalysed dehydration of 2-pentanol is:

- a) 4-pentene b) 3-pentene c) 2-pentene d) 1-pentene

333. Which gas is commonly used in welding?

- a) C₂H₄ b) C₂H₂ c) CH₄ d) C₂H₆

334. The synthesis of 3-octyne is achieved by adding a bromoalkane into a mixture of sodium amide and an alkyne. The bromoalkane and alkyne respectively are

- a) BrCH₂CH₂CH₂CH₂CH₃ and CH₃CH₂C ≡ CH b) BrCH₂CH₂CH₃ and CH₃CH₂CH₂C ≡ CH
c) BrCH₂CH₂CH₂CH₂CH₃ and CH₃C ≡ CH d) BrCH₂CH₂CH₂CH₃ and CH₃CH₂C ≡ CH

335. Which is most acidic of the following?

- a) Methane b) Acetylene c) 1-butene d) *Neo*-pentane

336. Addition of HI on double bond of propene yields isopropyl iodide and not *n*-propyl iodide as the major product, because addition proceeds through:

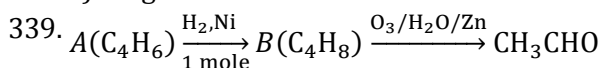
- a) A more stable carbonium ion
b) A more stable carbanion
c) A more stable free radical
d) None of the above

337. Correct statement about 1,3-dibutene

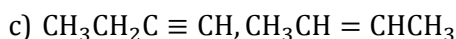
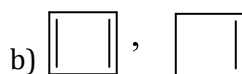
- a) Conjugated double bonds are present b) Reacts with HBr
c) Forms polymer d) All of the above

338. Preparation of ethane by electrolysis of aqueous solution of potassium acetate is called

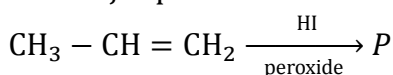
- a) Wurtz reaction b) Kolbe's synthesis
c) Grignard reaction d) Sabatier-Sendersen's reaction

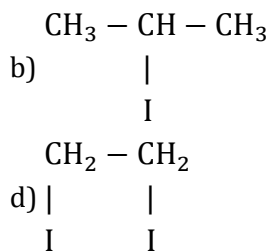
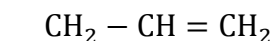
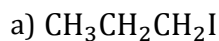


Thus, A and B are



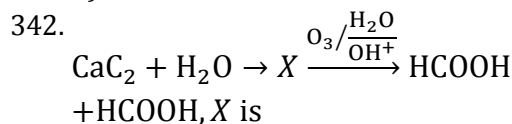
340. The major product P in the following reaction is





341. $\text{CH}_3\text{CH} = \text{CHCHO}$ is oxidized to $\text{CH}_3\text{CH} = \text{CHCOOH}$ using:

- a) Alkaline permanganate
 b) Ammoniacal silver nitrate
 c) Selenium dioxide
 d) Osmium tetroxide



- a) C_2H_4 b) C_2H_2 c) C_2H_6 d) $\text{Ca}(\text{OH})_2$

343. Acetylene reacts with hypochlorous acid to form

- a) $\text{Cl}_2\text{CH} \cdot \text{CHO}$ b) ClCH_2COOH c) CH_3COCl d) ClCH_2CHO

344. Dehydrohalogenation of 1,2-dibromobutane with alc. KOH gives:

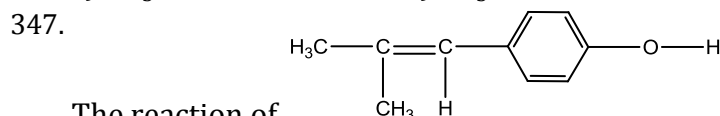
- a) 1-butyne b) 2-butene c) 1-butene d) 1-bromo-1-butene

345. Water can be added across a triple bond in the presence of

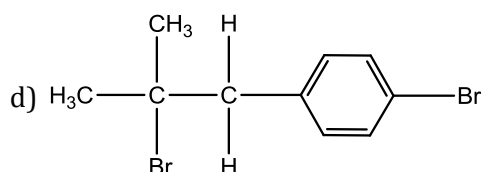
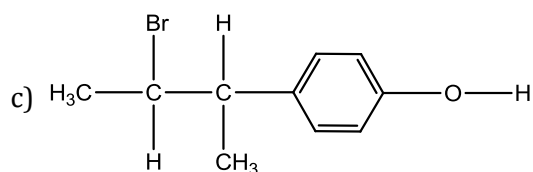
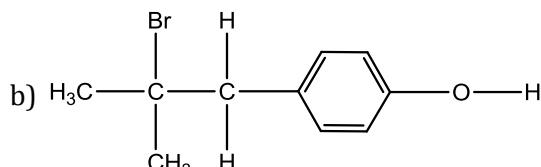
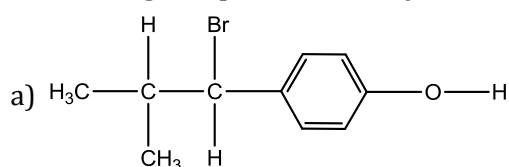
- a) Acidic medium b) Alkaline medium c) Neutral medium d) Acid and HgSO_4

346. Both methane and ethane may be obtained in one step reaction from:

- a) CH_3COONa b) CH_3I c) Both (a) and (b) d) None of these



The reaction of
 with HBr gives predominantly



348. The product formed when acetylene is passed through red hot tube is:

- a) Benzene b) Cyclohexane c) Neoprene d) Ethane

349. The product formed when toluene is heated in light with Cl_2 and in absence of halogen carrier is

- a) Chlorobenzene b) Gammexane c) Benzotrichloride d) DDT

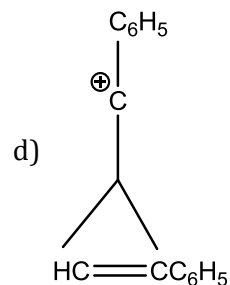
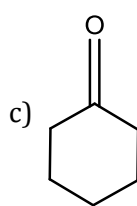
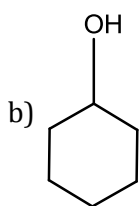
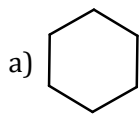
350. Among the following statement on the nitration of aromatic compounds, the false one is

- a) The rate of nitration of benzene is almost the same as that of hexadeuterobenzene
 b) The rate of nitration of toluene is greater than that of benzene
 c) The rate of nitration of benzene is greater than that of hexadeuterbenzene
 d) Nitration is an electrophilic substitution reaction

351. Reaction of one molecule of HBr with one molecule of 1, 3-butadiene at 40°C gives predominantly

- a) 1-bromo-2-butene under kinetically controlled conditions
 b) 3-bromobutene under thermodynamically controlled conditions
 c) 1-bromo-2-butene under thermodynamically controlled conditions

d) 3-bromobutene under kinetically controlled conditions
 352. Which of the following compound is aromatic?



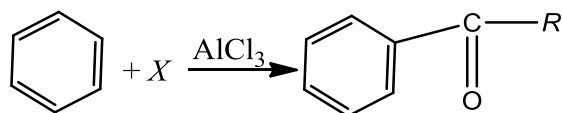
353. Ethylene reacts with 1% alkaline KMnO_4 to form

- a) Oxalic acid b) Ethylene glycol c) Ethyl alcohol d) HCHO

354. To prepare a pure sample of *n*-hexane using sodium metal as one reactant, the other reactant or reactants will be:

- a) Ethyl chloride and *n*-butyl chloride
 b) Methyl bromide and *n*-pentyl bromide
 c) *n*-propyl bromide
 d) Ethyl bromide and *n*-butyl bromide

355. Friedel-Craft acylation can be given by



X is

- a) $\begin{array}{c} R - C - Cl \\ || \\ O \end{array}$ b) $\begin{array}{c} R - C - R \\ || \\ O \end{array}$ c) $\begin{array}{c} R - C - H \\ || \\ O \end{array}$ d) $R - O - R$

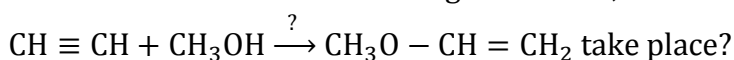
356. A mixture of CS_2 and H_2S on passing over heated Cu gives:

- a) C_2H_6 b) CH_4 c) C_3H_8 d) None of these

357. Photochemical chlorination of alkane is initiated by a process of:

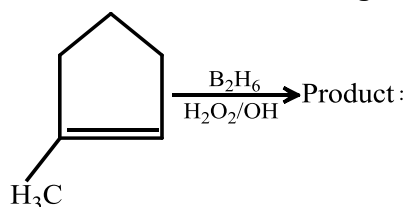
- a) Pyrolysis b) Substitution c) Homolysis d) Peroxidation

358. Under which one of the following conditions, does the reaction,

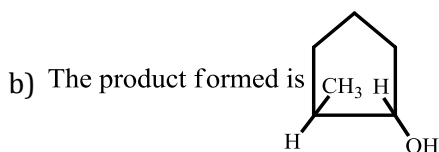


- a) $\text{NH}_4\text{OH}/80^\circ\text{C}$ b) Conc. $\text{H}_2\text{SO}_4/160^\circ\text{C}$
 c) Anhydrous $\text{ZnCl}_2/150^\circ\text{C}$ d) $\text{CH}_3\text{OK}/160 - 200^\circ\text{C}$

359. Which one is correct for the given change?



- a) The product formed is *trans*-2-methyl-1-cyclopentanol

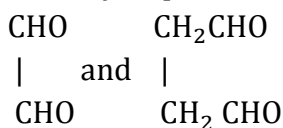


- c) The addition is syn addition
 d) All of the above

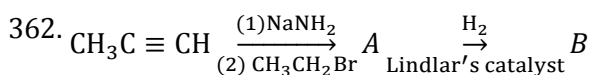
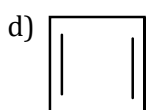
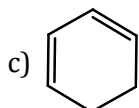
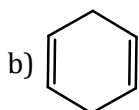
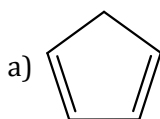
360. The electrolysis of aqueous solution of potassium succinate produces

- a) Methyl alcohol b) ethyl alcohol c) ethene d) ethane

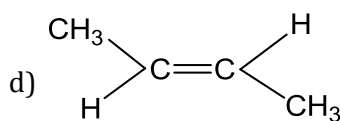
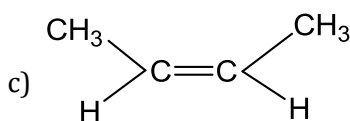
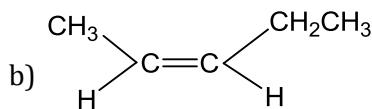
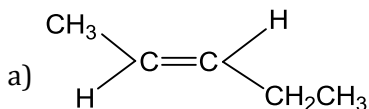
361. Ozonolysis products of an olefin are



Olefin is



What is B in the above reaction?



363. The gas believed to be the cause of explosion in coal-mines or fire damp is:

- a) Methane b) Ethane c) C_3H_8 d) CO

364. Addition of HBr to propylene in presence of benzoyl peroxide, follows

- a) Markownikoff's rule b) Baeyer's rule
c) Carbanion mechanism d) *anti*-Markownikoff's rule

365. 2-phenyl propene on acidic hydration gives,

- a) 2-phenyl-2-propanol b) 2-phenyl-1-propanol
c) 3-phenyl-1-propanol d) 1-phenyl-2-propanol

366. $\text{CH}_2 = \text{CH}_2$ is also called a:

- a) Monomer b) Polymer c) Isomer d) Equimer

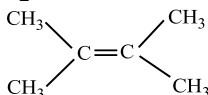
367. Halogenation of alkanes is an example of:

- a) Electrophilic substitution
b) Nucleophilic substitution
c) Free radical substitution
d) Oxidation

368. The most stable isomer of 1,2-dichloroethane is:

- a) Staggered b) Gauche c) Eclipsed d) Partially eclipsed

369. Which does not decolourize Br_2 water?

- a) $\text{CH}_2 = \text{CH}_2$ b)  c) $\text{CH}_3\text{C} \equiv \text{CH}$ d) $\text{CH}_2 = \text{CHCH}_3$

370. Grignard's reagent gives alkane with:

- a) H_2O b) $\text{C}_2\text{H}_5\text{OH}$ c) $\text{C}_2\text{H}_5\text{NH}_2$ d) All of these

371. The carbon-carbon bond length in benzene is

- a) In between C_2H_6 and C_2H_4 b) Same as in C_2H_4
c) In between C_2H_6 and C_2H_2 d) In between C_2H_4 and C_2H_2

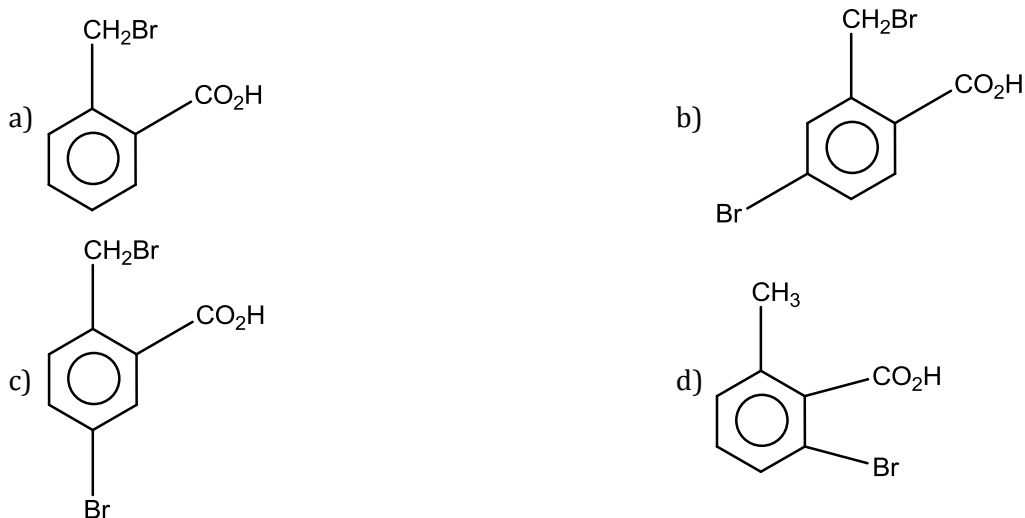
372. Electrolysis of a concentrated solution of sodium fumarate gives:

- a) Fumaric acid b) Ethylene c) Ethane d) Acetylene

373. In order to overcome angle strain, cyclohexane acquires:

- a) Square planar structure
b) Planar structure
c) Puckered ring structure
d) Pyramidal structure

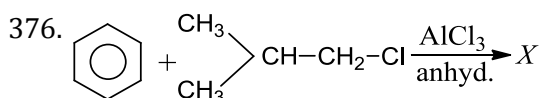
374. *o*-toluic acid on reaction with $\text{Br}_2 + \text{Fe}$ gives



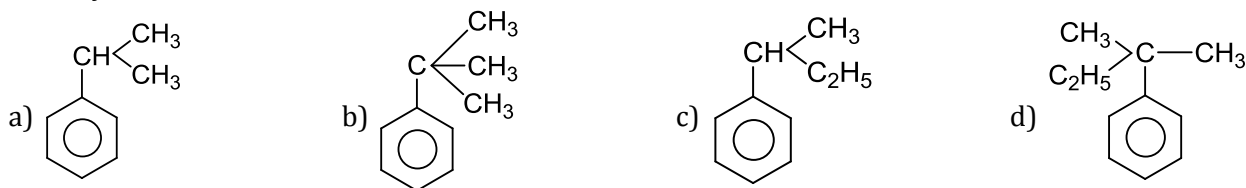
375. The reaction, $\text{CH}_2=\text{CH}_2 + \text{H}_2 \xrightarrow[250-300^\circ\text{C}]{\text{Ni}} \text{CH}_3-\text{CH}_3$

is called:

- a) Wurtz's reaction b) Kolbe's reaction c) Sabatier and Senderens reaction d) Carbylamines reaction



Identify the X in the above reaction



377. $\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{NOCl} \rightarrow P$

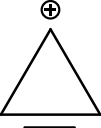
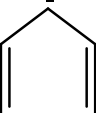
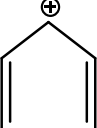
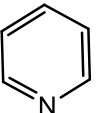
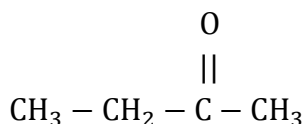
Identify the adduct



378. Ethane can be freed (isolated) from the impurity of ethylene by washing with:

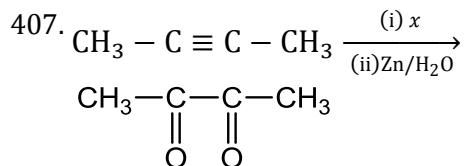
- a) HCl b) HNO_3 c) H_2SO_4 d) water

379. Poisonous gases are:
 a) Phosgene b) Lewisite c) Mustard gas d) All of these
380. A chlorohydrocarbon, named chlorodane is used especially as:
 a) Insecticide b) Anti-worm c) Fungicide d) Anti-termite
381. The highest boiling point is expected for
 a) *iso*-octane b) *n*-octane
 c) 2, 2, 3, 3-tetramethyl butane d) *n*-butane
382. The addition of tetraethyl lead of petrol:
 a) Lowers its octane number
 b) Raises its octane number
 c) May raise or lower the octane number
 d) Has no effect on octane number
383. Which of the following reactions will give an alkyne?
 a) $\text{CH}_3\text{CBr}_2\text{CHBr}_2 \xrightarrow{\text{Zn/alc.}}$ b) $\text{CH}_3\text{CH}_2\text{CHBr}_2 \xrightarrow{\text{alc.KOH}}$
 c) $\text{CH}_3\text{CHBrCH}_2\text{Br} \xrightarrow{\text{NaNH}_2}$ d) All of the above
384. Which one among the following is assigned an octane number of zero?
 a) Iso-octane b) *n*-heptane c) Isoheptane d) 2-methyloctane
385. The process where straight run gasoline is cracked in order to increase octane number is called:
 a) Aromatization b) Rearrangement c) Substitution d) Reforming
386. The treatment of aluminum carbide with water or dilute acid produces
 a) acetylene b) ethene c) methane d) ethane
387. When acetylene is passed through red hot iron tube, compound *X* is formed. Which one of the following reactions will yield *X* as the major product?
 a) $\text{C}_6\text{H}_5\text{OH} + \text{Zn} \xrightarrow{\text{Distillation}}$ b) $\text{C}_6\text{H}_5\text{SO}_3\text{H} + \text{NaHCO}_3 \rightarrow$
 c) $\text{C}_6\text{H}_{12} + 3\text{H}_2 \xrightarrow{\text{Ni}}$ d) $\text{C}_6\text{H}_5\text{Cl} + \text{H}_2\text{O} \xrightarrow{\Delta}$
388. In the reaction
 $\text{C}_6\text{H}_5\text{CH}_3 \xrightarrow{\text{Oxidation}} \text{A} \xrightarrow{\text{NaOH}} \text{B} \xrightarrow{\text{Sodalime}} \text{C}$
 Identify *C* is
 a) $\text{C}_6\text{H}_5\text{OH}$ b) C_6H_6 c) $\text{C}_6\text{H}_5\text{COONa}$ d) $\text{C}_6\text{H}_5\text{ONa}$
389. The major product formed when a 3, 3-dimethyl butan-2-ol is heated with concentrated sulphuric acid, is
 a) 2,3-dimethyl-2-butene
 b) 2,3-dimethyl-1-butene
 c) 3,3-dimethyl-1-butene
 d) *cis* and *trans* isomers of 2,3-dimethyl-1-butene
390. Most of the hydrocarbons from petroleum are obtained by:
 a) Fractional distillation
 b) Fractional crystallization
 c) Vaporisation
 d) Polymerization
391. Cyclopentadienyl anion is
 a) Aromatic b) Non-aromatic c) Non-planar d) Aliphatic
392. Ozonolysis of buta-1,3-diene gives:
 a) HCHO and glyoxal
 b) CH_3CHO and glyoxal
 c) CO_2 and glyoxal
 d) $\text{HCHO} + \text{glyoxal} + \text{CH}_3\text{CHO}$
393. Which is not true in the case of natural gas?

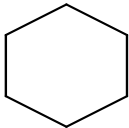
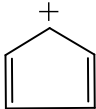

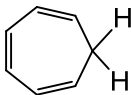
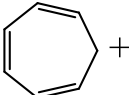
- a) It is a fuel
 b) It is used in the manufacture of fertilizer
 c) It is a mixture of CO_2 and H_2
 d) It is a mixture of gaseous hydrocarbons
394. Wurtz reaction using bromoethane yields:
 a) 2-bromobutane b) *n*-butane c) Isobutene d) Ethane
395. Which of the following compounds is not aromatic?
- a)  b)  c)  d) 
396. Which products are formed during the addition of Br_2 on ethylene in presence of aqueous NaNO_3 solution?
 a) $\text{CH}_2\text{Br} \cdot \text{CH}_2\text{ONO}_2$
 b) $\text{CH}_2\text{Br} \cdot \text{CH}_2\text{Br}$
 c) $\text{CH}_2(\text{ONO}_2) \cdot \text{CH}_2\text{ONO}_2$
 d) Both (a) and (b)
397. Alkanes containing.....carbon atoms are converted into an aromatic hydrocarbon, when heated in presence of Cr_2O_3 on Al_2O_3
 a) 6 to 10 b) 4 to 8 c) 3 to 6 d) 5 to 6
398. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous NaOH solution gives
 a) *o*-cresol b) *p*-cresol
 c) Benzoic acid d) 2,4-dihydroxytoluene
399. Toluene can be converted into benzaldehyde by oxidation with
 a) $\text{KMnO}_4/\text{alkali}$ b) CrO_2Cl_2 c) $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4$ d) $\text{O}_2/\text{V}_2\text{O}_5$
400. $\text{CH}_3 - \text{CH}_2 - \text{C} \equiv \text{CH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HgSO}_4} \text{A}$
 The compound A is
 a)  b) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CHO}$
 c) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$ d) None of the above
401. When acetylene is passed through dil. H_2SO_4 in presence of HgSO_4 , the compound formed is
 a) Ether b) Acetaldehyde c) Acetic acid d) Ketone
402. The reagent used for dehydration is:
 a) Conc. H_2SO_4 b) P_2O_5 c) Al_2O_3 d) All of these
403. A hydrocarbon has the formula C_3H_4 . To find out whether it contains two double bonds or triple bonds, the following test is performed:
 a) Passed through ammoniacal AgNO_3
 b) Treated with Baeyer's reagent
 c) Treated with Fehling's solution
 d) Treated with Br_2 water
404. The chemicals and the reaction conditions required for the preparation of ethane are
 a) $\text{C}_2\text{H}_5\text{I}, \text{Zn} - \text{Cu}, \text{C}_2\text{H}_5\text{OH}$ b) $\text{CH}_3\text{Cl}, \text{Na}, \text{H}_2\text{O}$
 c) $\text{KOOC} - \text{CH} = \text{CH} - \text{COOK}$, electrolysis d) $\text{CH}_3\text{CO}_2\text{Na}, \text{NaOH}, \text{CaO}, \Delta$
405. Formation of alkane by the action of zinc on alkyl halide is called
 a) Wurtz reaction b) Kolbe's reaction c) Ulmann's reaction d) Frankland reaction
406. The two carbon atoms marked by asterisk in
 $\text{H}_3\text{C} - \overset{*}{\text{C}} \equiv \overset{*}{\text{C}} - \text{CH}_3$ possess

the following type of hybridisation:

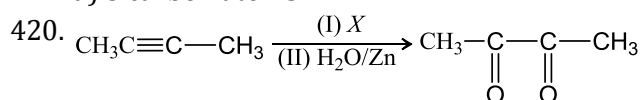
- a) sp^3 b) sp^2 c) sp d) s



In the above reaction x is.

- a) HNO_3 b) O_2 c) O_3 d) KMnO_4
408. Temperature of oxyacetylene flame is:
a) 2549°C b) 2400°C c) 2700°C d) 3000 to 3500°C
409. Benzene can be obtained by heating either benzoic acid with X or phenol with Y . X and Y are respectively
a) Zinc dust and soda lime b) Soda lime and zinc dust
c) Zinc dust and sodium hydroxide d) Soda lime and copper
410. Hydrocarbon reacts with metal by displacing the H-atom is:
a) CH_4 b) C_2H_6 c) C_2H_4 d) C_2H_2
411. Petroleum is a mixture of:
a) Aromatic hydrocarbons with small amounts of aliphatic compounds
b) Aliphatic hydrocarbons with small amounts of aromatic compounds
c) Mixture of equal amount of aliphatic and aromatic hydrocarbons
d) Alcohols and fatty acids
412. The reduction of an alkyne to alkene using Lindlar catalyst result into
a) *cis* addition of hydrogen atoms
b) *trans* addition of hydrogen atoms
c) A mixture obtained by *cis* and *trans* additions of hydrogen atoms which are in equilibrium with each other
d) A mixture obtained by *cis* and *trans* additions of hydrogen atoms which are not in equilibrium with each other
413. Which molecule will undergo radical formation oxidation reaction most readily?
a) $\text{CH}_3\text{CH}_2\text{CH}_3$ b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ c) $(\text{CH}_3)_3\text{CH}$ d) 
414. Which of the following is expected to be aromatic?
a)  b)  c)  d) 
415. Aniline is treated with a mixture of sodium nitrite and hypophosphorus acid, the product formed is
a) Aniline diazonium hypophosphate b) Benzene
c) Anilinium hypophosphite d) Aniline diazonium hypophosphite
416. Hexachloroethane is also called
a) DDT b) TNT c) Artificial camphor d) BHC
417. In presence of nickel cyanide, acetylene gives
a) Benzene b) Cyclooctatetraene c) Cyclohexatriene d) Cyclobutadiene
418. Conjugated double bonds are present in:
a) Propylene b) Isobutylene c) Butylene d) 1,3-butadiene
419. Normal alkanes can undergo sulphonation if they contain:
a) 4 carbon atoms

- b) 5 carbon atoms
- c) At least 6 carbon atoms
- d) 3 carbon atoms



In the above reaction, X is

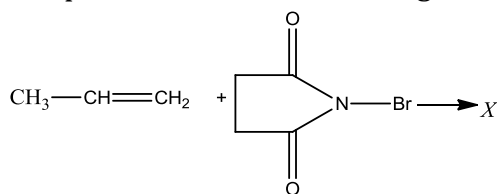
- a) HNO_3 b) O_2 c) O_3 d) KMnO_4
- 421. The dehydrohalogenation of neopentyl bromide with alcoholic KOH gives mostly:
 - a) 2-methyl-1-butene b) 2,2-dimethyl-1-butene c) 2-methyl-2-butene d) 2-butene
- 422. What is obtained, when ammoniacal AgNO_3 reacts with acetylene?
 - a) Propanone b) Silver acetylide c) Ethylene d) None of these
- 423. Which of the following liberates methane on treatment with water?
 - a) Silicon carbide b) Calcium carbide c) Beryllium carbide d) Magnesium carbide
- 424. Which statement is correct?
 - a) Chloroacetic acid is less acidic than acetic acid because chlorine atom has -I effect
 - b) The greater the branching in a paraffin the lower is its b.p.
 - c) Kjeldahl's method is used for the estimation of chlorine
 - d) All of the above
- 425. The most stable conformational isomer of cyclohexane is:
 - a) Chair form b) Boat form c) Half chair form d) Twisted form
- 426. In the following reaction sequences,

$$\text{Cl}-\text{Cl} \longrightarrow \dot{\text{Cl}}+\dot{\text{Cl}} \quad \dots (1)$$

$$\dot{\text{Cl}}-\text{CH}_4 \longrightarrow \dot{\text{C}}\text{H}_3+\text{HCl} \quad \dots (2)$$

$$\dot{\text{C}}\text{H}_3+\dot{\text{Cl}}_2 \longrightarrow \dot{\text{C}}\text{H}_3+\text{Cl}+\dot{\text{Cl}} \quad \dots (3)$$

$$\dot{\text{C}}\text{H}_3+\dot{\text{C}}\text{H}_3 \longrightarrow \text{CH}_3-\text{CH}_3 \quad \dots (4)$$
 the termination step is:
 - a) Reaction 1 b) Reaction 2 c) Reaction 3 d) Reaction 4
- 427. Which of the following is elimination reaction?
 - a) $\text{CH}_3\text{CH}_2\text{OH} \longrightarrow \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O}$
 - b) $\text{CH}_3\text{CH}_2\text{Br} \longrightarrow \text{CH}_2 = \text{CH}_2 + \text{HBr}$
 - c) $\text{Br}-\text{CH}_2-\text{CH}_2-\text{Br} \xrightarrow{\text{Zn}} \text{CH}_2 = \text{CH}_2 + \text{ZnBr}_2$
 - d) All of the above are correct
- 428. $\text{CH} \equiv \text{CH} \xrightarrow{\text{O}_3/\text{NaOH}} \text{X} \xrightarrow{\text{Zn}/\text{CH}_3\text{COOH}} \text{Y}$. Y is:
 - a) $\text{CH}_2\text{OH}-\text{CH}_2\text{OH}$ b) $\text{CH}_3\text{CH}_2\text{OH}$ c) CH_3COOH d) CH_3OH
- 429. Baeyer's reagent is used in the laboratory for:
 - a) Detection of double bonds b) Detection of glucose c) Reduction d) Oxidation
- 430. Product formed on electrolysis of potassium salt of fumaric and maleic acid is
 - a) Ethane b) Ethene c) Ethyne d) Methane
- 431. The product 'X' in the following reaction is

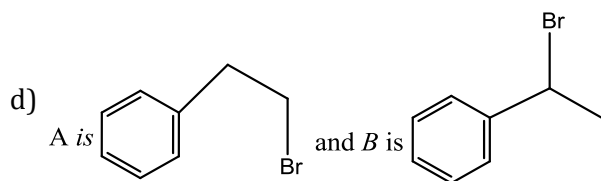
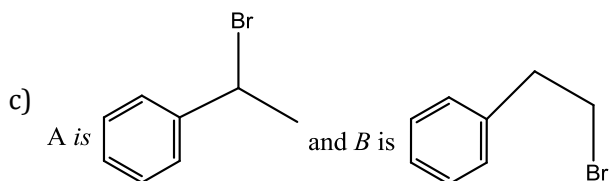
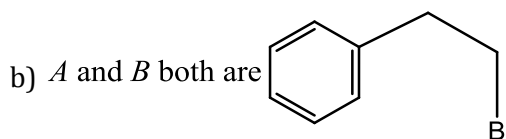
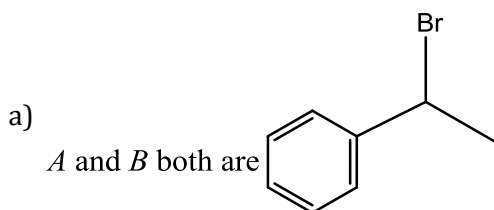
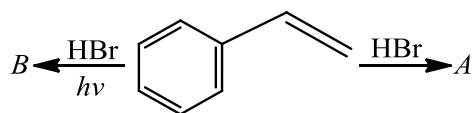


- a) $\text{CH}_3\text{Br}-\text{CH}=\text{CH}_2$
- b) $\text{CH}_3-\overset{\text{Br}}{\underset{|}{\text{C}}}=\text{CH}_2$

c) $\text{CH}_3\text{CH}=\text{CHBr}$

d) None of the above

432. Observe the following reactions and predict the nature of *A* and *B*.



433. HBr is added to $\text{CH}_3-\text{CH}=\text{CH}_2$ in presence of peroxides. The resultant compound is:

a) $\text{CH}_3\text{CHBrCH}_3$

b) $\text{C}_2\text{H}_5\text{CH}_2\text{Br}$

c) $\text{CH}_2=\text{CH}_2\text{CH}_2\text{Br}$

d) None of these

434. Amount of Br_2 required to react with 5 g pentene to form monobromo derivative is:

a) 11.11 g

b) 11.43 g

c) 5.55 g

d) None of these

435. The compound (i) decolourises KMnO_4 (ii) forms ozonide with ozone and (iii) undergoes polymerization. It will be:

a) C_6H_6

b) C_3H_8

c) C_2H_4

d) C_2H_6

436. The strongest *ortho/para* directing group is

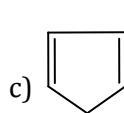
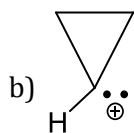
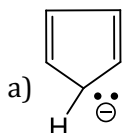
a) $-\text{NH}_2$

b) $-\text{CH}_3$

c) $-\text{Cl}$

d) $-\text{C}_2\text{H}_5$

437. Which of the following species will be aromatic?



d) None of these

438. When chlorine is passed through warm benzene in presence of the sunlight, the product obtained is

a) Benzotrichloride

b) Chlorobenzene

c) Gammexane

d) DDT

439. The $\text{C}=\text{C}$ bond distance in an organic compound is 1.34 \AA . It can be

a) Butene

b) Hexatriene

c) Cyclohexatriene

d) Any of these

440. The lowest possible alkane with ethyl group as substituents possesses mol. mass equal to:

a) 16

b) 72

c) 84

d) 128

441. The reagent(s) for the following conversion, *cis/are*

a) Alcoholic KOH

b) Alcoholic KOH followed by NaNH_2

c) Aqueous KOH followed by NaNH_2

d) $\text{Zn}/\text{CH}_3\text{OH}$

442. Aqueous H_2SO_4 reacts with 2-methyl-1-butene to give predominantly:

a) Isopentyl hydrogen sulphate

b) 2-methyl-3-butene

c) 2-methyl-1-butene

d) Secondary butyl hydrogen sulphate

443. The number of conformation(s) for ethane is/are:

a) 1

b) 2

c) 3

d) Infinite

444. The test for unsaturation is confirmed by the decolourisation of which of the following?

a) Iodine water

b) CuSO_4 solution

c) Bromine water

d) All of these

445. Which does not react with chlorine in dark?

- a) CH_4 b) C_2H_2 c) C_2H_4 d) CH_3CHO

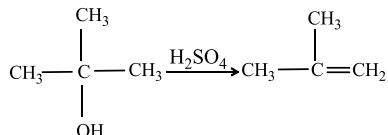
446. The ozonolysis of isobutene gives:

- a) CH_3CHO b) CH_3COCH_3 and HCHO c) $\text{CH}_3\text{CH}_2\text{OH}$ d) CH_3OH

447. Which compound on reductive ozonolysis forms only glyoxal?

- a) Ethyne b) Ethene c) Ethane d) 1,3-butadiene

448. The reaction,

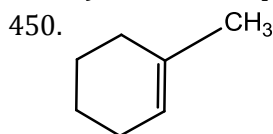


is the example of:

- a) Sulphonation b) Dehydration c) Alkylation d) Decomposition

449. The catalyst used in the manufacture of polythene by Ziegler method is:

- a) Titanium tetrachloride and triphenyl aluminium
b) Titanium tetrachloride and trimethyl aluminium
c) Titanium dioxide
d) Titanium isopropoxide



On reductive ozonolysis yields

- a) 6-oxoheptanal b) 6-oxoheptanoic acid
c) 6-hydroxyheptanal d) 3-hydroxypentanal

451. The treatment of CH_3MgX with $\text{CH}_3\text{C} \equiv \text{C} - \text{H}$ produces

- a) $\text{CH}_3 - \text{CH} = \text{CH}_2$ b) $\text{CH}_3\text{C} \equiv \text{C} - \text{CH}_3$ c) $\begin{array}{cc} \text{H} & \text{H} \\ | & | \\ \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \end{array}$ d) CH_4

452. 1,3-butadiene has:

- a) Only sp -hybridised C-atoms
b) Only sp^2 -hybridised C-atoms
c) sp , sp^2 and sp^3 -hybridised C-atoms
d) sp and sp^2 -hybridised C-atoms

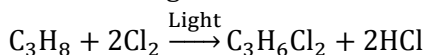
453. Chloroform, on warming with Ag powder gives

- a) C_2H_6 b) C_2H_6 c) C_2H_4 d) C_2H_2

454. By Wurtz reaction, a mixture of methyl iodide and ethyl iodide gives

- a) Butane b) Ethane
c) Propane d) A mixture of the above three

455. The following reaction is an example of,



- a) An addition reaction
b) A substitution reaction
c) An elimination reaction
d) None of the above

456. Acetylene on passing into excess of HOCl solution forms:

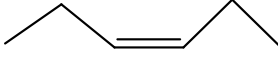
- a) Ethylene chlorohydrin
b) Acetaldehyde
c) Dichloroacetaldehyde
d) Methyl chloride

457. Ethylene forms ethylene chlorohydrin by the action of:

- a) Dry chlorine gas
- b) Dry hydrogen chloride gas
- c) Solution of chlorine gas in water
- d) Dilute hydrochloric acid

458. Which one of the following has the smallest heat of hydrogenation per mole?

- a) 1-butene
- b) *Trans*-but-2-ene
- c) *Cis*-but-2-ene
- d) Buta-1, 3-diene

459.  $\xrightarrow[\text{H}_2\text{O}_2]{\text{OsO}_4}$ A, A is

- a) *meso* diol
- b) Racemic diol
- c) Both (a) and (b)
- d) None of these

460. Which of the following characteristic apply both to ethane and ethyne?

- a) Explode when mixed with chlorine
- b) Decolourise Baeyer's reagent giving brown precipitate
- c) Rapidly absorbed by cold conc. H_2SO_4
- d) Form white precipitate with AgNO_3 solution

461. Conjugated double bond is present in:

- a) Propylene
- b) Isobutylene
- c) 1,3-butadiene
- d) Butylene

462. The reactivities of ethane, ethylene and acetylene are of the order

- a) Ethane < ethene < ethyne
- b) Ethane < ethyne < ethene
- c) Ethyne = ethene > ethane
- d) Any of the above

463. Which is not linked with methane?

- a) Marsh gas
- b) Natural gas
- c) Producer gas
- d) Coal gas

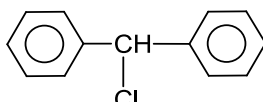
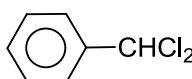
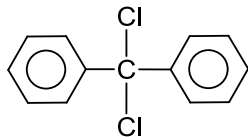
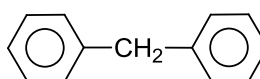
464. Acetylene can be obtained by the reaction?

- a) $\text{HCOOK} \xrightarrow{\text{Electrolysis}}$
- b) $\text{CHI}_3 + \text{Ag} \xrightarrow{\Delta}$
- c) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[443\text{ K}]{\text{Conc. H}_2\text{SO}_4}$
- d) $\text{Be}_2\text{C} + \text{H}_2\text{O} \rightarrow$

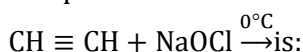
465. Wet ether is not used as a solvent in Wurtz reaction, because the water present in it

- a) Hydrolyses RX to ROH
- b) Reduces RX to RH
- c) Destroy the Na metal
- d) Reacts with $\text{R} - \text{R}$

466. When excess of C_6H_6 reacts with CH_2Cl_2 in presence of anhydrous AlCl_3 , the following compound is obtained

- a) 
- b) 
- c) 
- d) 

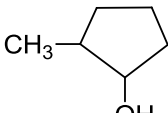
467. The product formed during the reaction,

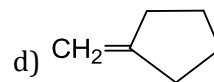
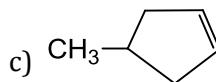
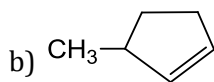
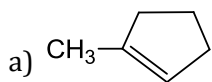


- a) 1,2-dichloroethane
- b) 1,2-dichloroethanal
- c) 1,2-dichloroethene
- d) 1,2-dichloroethyne

468. Out of the following fractions of petroleum the one having the lowest boiling point is:

- a) Kerosene
- b) Diesel oil
- c) Gasoline
- d) Heavy oil

469.  $\xrightarrow{\text{POCl}_3}$ A (major), A is



470. Acetylene on reacting with hypochlorous acid gives:

- a) CH_3COCl b) ClCH_2CHO c) $\text{Cl}_2\text{CH}\cdot\text{CHO}$ d) ClCH_2COOH

471. The reduction of 4-octyne with H_2 in the presence of Pd/CaCO_3 quinoline gives

- a) *trans*-4-octene b) *cis*-4-octene
c) A mixture of *cis*-and *trans*-4-octene d) A completely reduced product C_8H_{18}

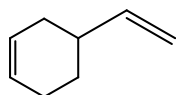
472. $\text{R}-\text{CH}=\text{CH}_2 \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{Na}/\text{NH}_3(l)} \text{RCH}_2\text{CH}_3$ is called:

- a) Clemmensen reduction
b) Fisher-Spier reduction
c) Birch reduction
d) Arndt-Eistert reduction

473. Which one of the following compounds will react with methyl magnesium iodide?

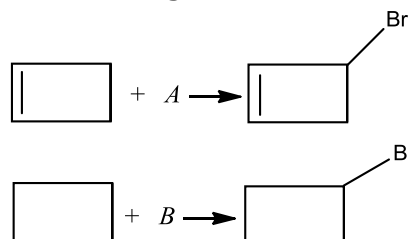
- a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ b) $\text{CH}_3\text{CH}=\text{CH}-\text{CH}=\text{CH}_2$
c) $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_2\text{CH}_3$ d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}\equiv\text{CH}$

474. Degree of unsaturation in the following compound is



- a) 1° b) 2° c) 3° d) 4°

475. Suitable reagents *A* and *B* for the following reactions are



- a) Br, Br_2 b) Br_2, NBS c) NBS, NBS d) NBS, Br_2

476. During ozonolysis of $\text{CH}_2=\text{CH}_2$ if reduction is carried out by LiAlH_4 the products formed are:

- a) HCHO b) HCOOH c) CH_3OH d) $\text{CH}_2\text{OHCH}_2\text{OH}$

477. Ethyl hydrogen sulphate is obtained by reaction of H_2SO_4 on:

- a) Ethylene b) Ethane c) Ethyl chloride d) Ethanal

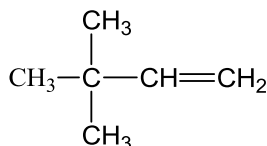
478. When HCl gas is passed through propene in the presence of benzoyl peroxide, it gives:

- a) *n*-propyl chloride b) 2-chloropropane c) Allyl chloride d) No reaction

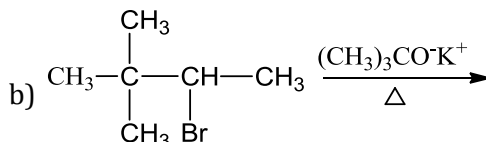
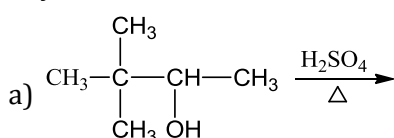
479. Hydrocarbon which is liquid at room temperature is

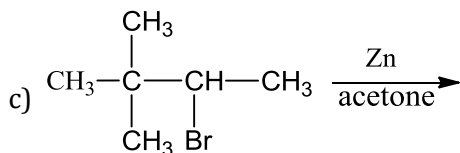
- a) Pentane b) Butane c) Propane d) Ethane

480. Which of the following reactions are not expected to give



In yields of more than 50%?





d) None of the above

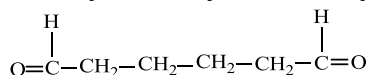
481. Incorrect name of an alkyne is:

- a) Propyne b) But-2-yne c) Pent-3-yne d) But-1-yne

482. The alkyne which gives pyruvic acid ($\text{CH}_3\text{COCO}_2\text{H}$) on oxidation with alk. KMnO_4 is:

- a) $\text{CH} \equiv \text{CH}$ b) $\text{CH}_3\text{C} \equiv \text{CH}$ c) $\text{CH}_3\text{C} \equiv \text{C} - \text{CH}_3$ d) $\text{CH}_3 - \text{CH}_2 - \text{C} \equiv \text{CH}$

483. A hydrocarbon of formula C_6H_{10} absorbs only one molecule of H_2 upon catalytic hydrogenation. Upon ozonolysis the hydrocarbon yields,

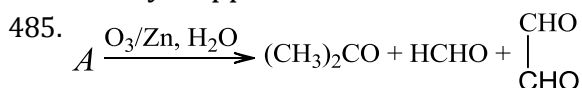


The hydrocarbon is :

- a) Cyclohexane b) Benzene c) Cyclohexene d) Cyclobutane

484. Alkyl halides react with dialkyl copper reagents to give

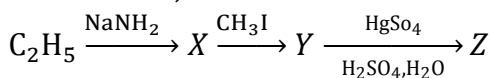
- a) Alkenyl halides b) Alkanes
c) Alkyl copper halides d) Alkenes



Thus, A is

- a) $(\text{CH}_3)_2\text{CHCH} = \text{CHCH} = \text{CH}_2$ b) $(\text{CH}_3)_2\text{C} = \text{CH} - \text{CH} = \text{CH}_2$
c) $\text{CH}_3\text{CH} = \text{CH} - \text{CH} = \text{CH} - \text{CH} = \text{CH}_2$ d) none of the above

486. In the series,



The compound Z is

- a) $\text{CH}_3\text{CH}_2\text{CH} = \text{CH}_2$ b) CH_3COCH_3 c) CH_3CHO d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$

487. Paraffin dissolves in:

- a) Distilled water b) Benzene c) Methanol d) Salt water

488. Which cannot be prepared by Kolbe's electrolytic reaction using single salt?

- a) CH_4 b) C_2H_6 c) C_4H_{10} d) H_2

489. Which will react with NaBH_4 ?

- a) Benzoic acid b) Benzamide c) Cyclohexanone d) Acetic acid

490. When methane is made to react with a halogen (X_2), halides are formed, the order of reactivity is:

- a) $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$ b) $\text{Cl}_2 > \text{F}_2 > \text{Br}_2 > \text{I}_2$ c) $\text{I}_2 > \text{Br}_2 > \text{Cl}_2 > \text{F}_2$ d) $\text{Cl}_2 > \text{F}_2 > \text{I}_2 > \text{Br}_2$

491. Which of these does not follow *anti* -Markownikoff's rule?

- a) 2-butene b) 1-butene c) 2-pentene d) 2-hexene

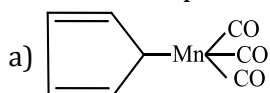
492. Acetylene reacts with HCN in the presence of $\text{Ba}(\text{CN})_2$ to yield

- a) 1,1-dicyanoethane b) 1,2-dicyanoethane c) Vinyl cyanide d) None of these

493. An alkyl bromide (X) reacts with Na to form 4, 5-diethyl octane. Compound (X) is:

- a) $\text{CH}_3(\text{CH}_2)_3\text{Br}$
b) $\text{CH}_3(\text{CH}_2)_5\text{Br}$
c) $\text{CH}_3(\text{CH}_2)_3\text{CHBr} \cdot \text{CH}_3$
d) $\text{CH}_3(\text{CH}_2)_2\text{CHBrCH}_2\text{CH}_3$

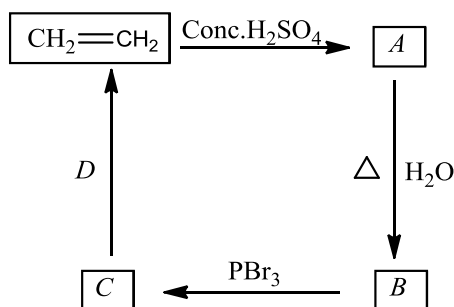
494. To avoid lead pollution, a new anti-knock compound is used. It is:



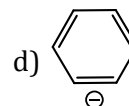
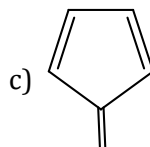
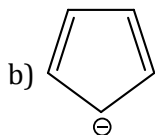
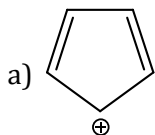
- b) Cyclopentadienyl manganese carbonyl

- c) AK-33-*X*
 d) All of the above

495. Identify *B* and *D* in the following sequence of reactions.



- a) Methanol and bromoethane
 b) Ethyl hydrogen sulphate and alcoholic KOH
 c) Ethyl hydrogen sulphate and aqueous KOH
 d) Ethanol and alcoholic KOH
496. Angle strain in cyclopropane is
 a) $24^\circ 44'$
 b) $9^\circ 44'$
 c) $44'$
 d) $-5^\circ 16'$
497. When propyne react with H_2O in presence of dil. H_2SO_4 and HgSO_4 product formed is
 a) Acetone
 b) Acetaldehyde
 c) Acetic acid
 d) Ethyl alcohol
498. Which of the following compounds cannot be prepared singly by the Wurtz reaction?
 a) C_2H_6
 b) $(\text{CH}_3)_2\text{CHCH}_3$
 c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
 d) All can be prepared
499. The olefin which on ozonolysis gives $\text{CH}_3\text{CH}_2\text{CHO}$ and CH_3CHO is:
 a) 1-butene
 b) 2-butene
 c) 1-pentene
 d) 2-pentene
500. Which statement is false?
 a) Peroxide effect is applicable only for HBr and not for the other halogen halides
 b) Meta directing groups are deactivating groups
 c) Chlorination of methane follows an ionic mechanism
 d) In benzene the C atoms are sp^2 -hybridized
501. The presence of unsaturation (olefinic or acetylinic bond) in an organic compound can be tested with:
 a) Schiff's reagent
 b) Tollen's reagent
 c) Fehling's solution
 d) Baeyer's reagent
502. An alkene on reductive ozonolysis gives 2-molecules of $\text{CH}_2(\text{CHO})_2$. The alkene is
 a) 2,4-hexadiene
 b) 1,3-cyclohexadiene
 c) 1,4-cyclohexadiene
 d) 1-methyl-1, 3-cyclopentadiene
503. A mixture of ethyl iodide and *n*-propyl iodide is subjected to Wurtz reaction. The hydrocarbon that will not be formed is:
 a) *n*-butane
 b) *n*-propane
 c) *n*-pentane
 d) *n*-hexane
504. Which of the following reacts with benzene in presence of anhydrous aluminium chloride and forms acetophenone?
 a) CH_3Cl
 b) CH_3COOH
 c) CH_3CHO
 d) CH_3COCl
505. Oxidation of 1-butene with hot KMnO_4 solution produces
 a) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$
 b) $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2$
 c) $\text{CH}_3\text{COOH} + \text{CO}_2$
 d) $(\text{CH}_3)_2\text{C} = \text{O} + \text{CO}_2$
506. Action of Br_2 on cyclopentene gives:
 a) 1,2-dibromo cyclopentane
 b) Cyclopentyl bromide
 c) Cyclopentyl dibromide
 d) No reaction
507. Which of the following species is aromatic?



508. Propene, $\text{CH}_3-\text{CH}=\text{CH}_2$ can be converted into 1-propanol by oxidation. Which set of reagents among the following is ideal to effect the conversion?

- a) Alkaline KMnO_4 b) B_2H_6 and alk. H_2O_2 c) O_3 /zinc dust d) $\text{OsO}_4/\text{CHCl}_3$

509. Compound which gives acetone on ozonolysis

- a) $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$ b) $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_3)_2$
c) $\text{C}_6\text{H}_5\text{CH}=\text{CH}_2$ d) $\text{CH}_3\text{CH}=\text{CH}_2$

510. Toluene, when treated with Br_2/Fe , gives p-bromotoluene as the major product because the $-\text{CH}_3$ group

- a) Is *meta* directing b) deactivates the ring
c) activates the ring by hyperconjugation d) None of the above

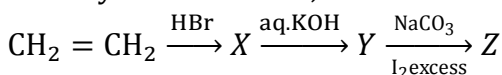
511. Alkynes occur in nature in the:

- a) Free state b) Partially free state c) Not in the free state d) None of the above

512. Which of the following will have least hindered rotation about carbon-carbon bond?

- a) Ethane b) Ethylene c) Acetylene d) Hexachloroethane

513. Identify Z in the series,



- a) $\text{C}_2\text{H}_5\text{I}$ b) $\text{C}_2\text{H}_5\text{OH}$ c) CHI_3 d) CH_3CHO

514. Action of NH_3 over C_2H_2 at high temperature gives:

- a) Amine b) Furan c) Thiophene d) Pyrrole

515. Wurtz reaction converts alkyl halide into alkane when it is made to react with

- a) Na in alcohol b) Na in dry ether c) Zn in alcohol d) Zn in dry ether

516. Polyethylene is a resin obtained by polymerization of:

- a) Butadiene b) Ethylene c) Isoprene d) Styrene

517. Cyclohexane (C_6H_{12}) a hydrocarbon, floats on water because:

- a) It is immiscible with water
b) Its density is less than that of water
c) It is a non-polar substance
d) It is immiscible and lighter than water

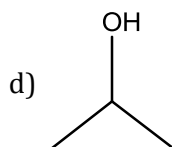
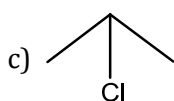
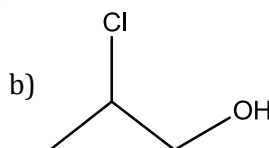
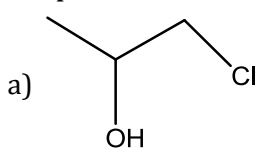
518. Which of the following are produced from coaltar?

- a) Synthetic dyes b) Drugs c) Perfumes d) All of these

519. The reduction of an alkyne to alkene using lithium metal in liquid ammonia as solvent results into

- a) *cis* addition of hydrogen atoms
b) *trans* addition of hydrogen atoms
c) Both *cis* and *trans* additions of hydrogen atoms. The relative amounts of the two depends on temperature
d) Both *cis* and *trans* additions of hydrogen atoms. The relative amounts depend on the nature of alkyne

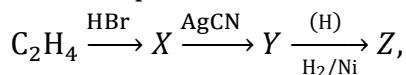
520. Propene on reaction with hypochlorous acid to give



521. A mixture of nitrogen and acetylene, on passing electric spark through it gives:

- a) Hydrogen and carbon b) Hydrogen cyanide c) Nitromethane d) Nitroethane

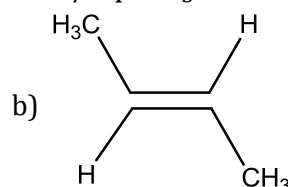
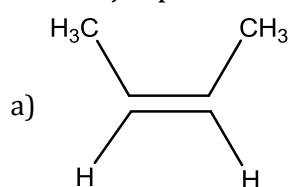
522. In the sequence of reactions,



Compound Z is

- a) N-methyl ethanamine b) N-propylamine
c) N, N-dimethylamine d) Ethyl cyanide
523. Which one of these is not true for benzene?
- a) It forms only one type of monosubstituted product.
b) There are three carbon-carbon single bonds and three carbon-carbon double bonds
c) The heat of hydrogenation of benzene is less than the theoretical value.
d) The bond angle between the carbon-carbon bonds is 120° .
524. Presence of a nitro group in a benzene ring
- a) Activates the ring towards electrophilic substitution
b) Renders the ring basic
c) Deactivates the ring towards nucleophilic substitution
d) Deactivates the ring towards electrophilic substitution

525. The major product in the reaction of 2-butyne with $\text{Li}/\text{liq. NH}_3$ is



c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

d) $\text{H}_2\text{C} = \text{CH} - \text{CH}_2 - \text{CH}_3$

526. Hydrocarbon liquid at STP is:

- a) Ethane b) Propane c) Butane d) Pentane
527. Chlorination of benzene is not possible in the following reaction

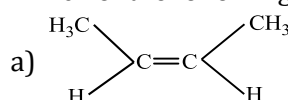


528. In the series, ethane, ethene and ethyne, the C-H bond energy is

- a) Same in all the three compounds b) Greatest in ethane
c) Greatest in ethene d) Greatest in ethyne
529. The shape of 2-butene is:
- a) Linear b) Planar c) Tetrahedral d) Pyramidal
530. The substance used as an anti-knock compound is:
- a) Tetraethyl lead b) Lead tetrachloride c) Lead acetate d) Ethyl acetate
531. Petroleum refining is:
- a) Obtaining aromatic compounds from aliphatic compounds in petroleum b) Cracking of petroleum to get gaseous hydrocarbons c) Purification of petroleum d) Distillation of petroleum to get different fractions

532. Zinc-copper couple that can be used as a reducing agent is obtained by:

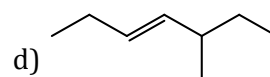
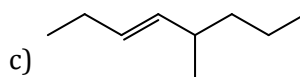
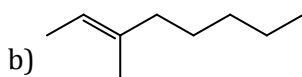
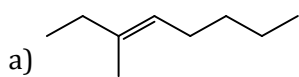
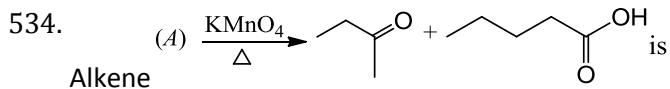
- a) Mixing zinc dust and copper gauze
b) Zinc coated with copper
c) Copper coated with zinc
d) Zinc and copper wires welded together
533. Which of the following hydrocarbons has the lowest dipole moment?



b) $\text{CH}_3\text{C} \equiv \text{CCH}_3$

c) $\text{CH}_3\text{CH}_2\text{C} \equiv \text{CH}$

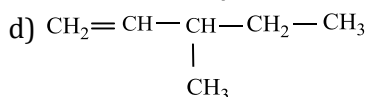
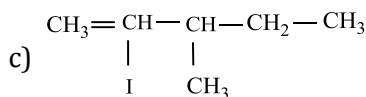
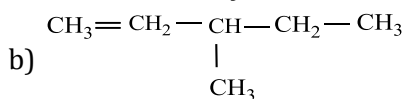
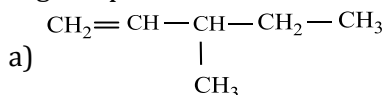
d) $\text{CH}_2 = \text{CH} - \text{C} \equiv \text{CH}$



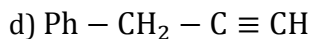
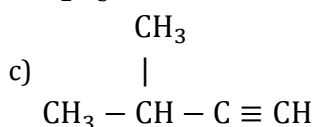
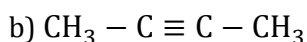
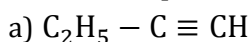
535. A solution of sodium salt of fatty acid was electrolysed during Kolbe's reaction. The solution left after electrolysis is:

- a) Richer in NaOH b) Richer in H_2SO_4 c) Richer in sodium salt d) All of these

536. Sample of 2,3-dibromo-3-methylpentane is heated with zinc dust. The resulting product is isolated and heated with HI in the presence of phosphorus. Indicate which is the structure that represents the final organic product in the reaction?



537. Which compound does not give precipitate with ammoniacal silver nitrate solution?



538. Hydroxylation of propyne in the presence of $HgSO_4/H_2SO_4$ is initiated by the attack of:

- a) Carbene b) Free radical c) Electrophile d) Nucleophile

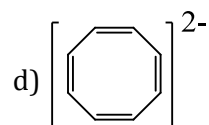
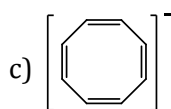
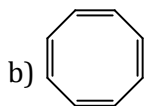
539. Benzene vapour mixed with air when passed over V_2O_5 catalyst at 775 K gives

- a) Glyoxal b) Oxalic acid c) Maleic anhydride d) Fumaric acid

540. Kolbe's synthesis on electrolysis of sodium salt of butanoic acid gives :

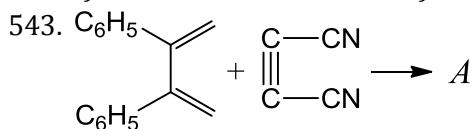
- a) *n*-hexane b) Isobutene c) Butane d) Ethene

541. Which among the following is aromatic?

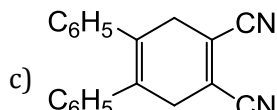
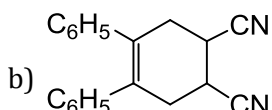
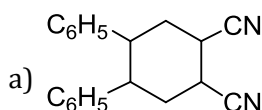


542. The neutral wax called Ozokerite found near petroleum well is a mixture of:

- a) Solid halides b) Solid hydrocarbons c) Solid alcohols d) None of these

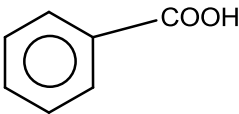
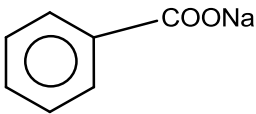
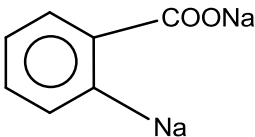






Identify A:



d) None of these

544. Which among the following are used as catalyst in cracking?

- a) Oxides of Al b) Oxides of Cr, Mo c) Oxides of V d) All of these
545. The general formula of a cycloalkane is
 a) C_nH_n b) C_nH_{2n} c) C_nH_{2n-2} d) C_nH_{2n+2}
546. Toluene reacts, with excess of Cl_2 in presence of sunlight to give a product, which on hydrolysis followed by reaction with NaOH gives
 a)  b)  c)  d) None of these
547. Which of the following alkanes can be easily sulphonated?
 a) *n*-butane b) Isobutene c) *n*-pentane d) *n*-hexane
548. When propionic acid is treated with aqueous sodium bicarbonate, CO_2 is liberated. The 'C' of CO_2 comes from:
 a) Methyl group b) Carboxylic group c) Methylene group d) Bicarbonate
549. 10mL of a certain hydrocarbon require 25mL of oxygen for complete combustion and the volume of CO_2 produced is 20mL. what is the formula of hydrocarbon?
 a) C_2H_2 b) C_2H_4 c) CH_4 d) C_2H_6
550. Which of the following compounds is the most stable?
 a)  b)  c)  d) 
551. The octane number of any fuel increases with:
 a) Increase in *n*-heptane
 b) Decrease in 2,2,4-trimethylpentane
 c) Increase in 2,2,4-trimethylpentane
 d) None of the above
552. 3-methyl-2-pentene on reaction with HOCl gives:
 a)
$$\begin{array}{c} \text{Cl} \quad \text{OH} \\ | \quad | \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$

 b)
$$\begin{array}{c} \text{CH}_3 \quad \text{OH} \\ | \quad | \\ \text{CH}_3 - \text{C} - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$

 c)
$$\begin{array}{c} \text{Cl} \quad \text{Cl} \\ | \quad | \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$

 d)
$$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{CH} - \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \quad \text{Cl} \end{array}$$
553. The reaction of propene with HOCl proceeds *via* the addition of
 a) Cl^+ and OH^- in a single step b) Cl^+ in the first step
 c) H^+ in the first step d) OH^- in the first step
554. Select the reagent for the following reaction,



- a) Short carbon to carbon bond distance
- b) High double bond energy
- c) Trigonal planar structure
- d) Presence of π -electrons

-

a) I and IV b) II and IV c) I and III d) II and III

- a) Base b) Acid c) Reducing agent d) Catalyst

- a) CH_3COCH_3
c) $\text{CH}_3\text{COOH} + \text{HCOOH}$
- b) $\text{CH}_3\text{COCH}_2\text{OH}$
d) $\text{CH}_3\text{CHO} + \text{HCHO}$

- a) Hydrocarbons
- b) Alcohols
- c) Carbohydrates
- d) Hydrocarbons and alcohols

- b) $\text{CH}_3\text{CH}_2\text{C} \begin{matrix} \text{//} & \text{O} \\ \backslash & \text{O} \end{matrix}$

- c) $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH} = \text{CH}_2$
d) None of the above

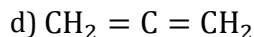
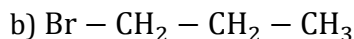
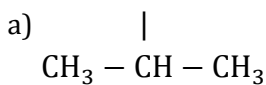
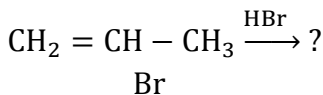
- a) Methane b) Ethane c) Propane d) Iso-butane

- a) 2-methyl-2-hexene b) 2-methyl-1-hexene
c) 3,4-dimethyl-3-hexene d) 2,3-dimethyl-3-hexene

- Oxalic acid and formic acid
- Acetic acid and ethylene glycol
- Ethyl alcohol and ethylene glycol

d) None of the above

565. According to Markownikoff's rule, what will be the major product of reaction



566. Carbon black, used in making printing ink is obtained by the oxidation of:

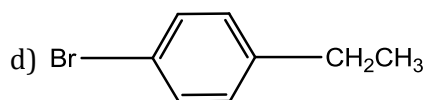
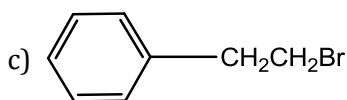
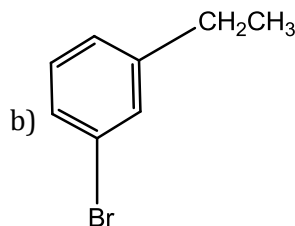
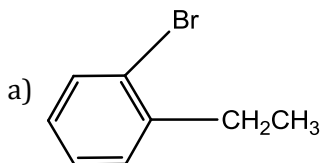
a) Acetylene

b) Benzene

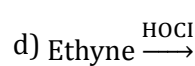
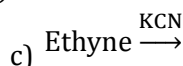
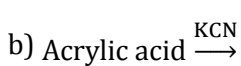
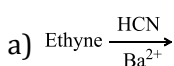
c) Methane

d) CCl_4

567. Ethylbenzene with bromine in presence of FeBr_3 , predominantly gives



568. Which reaction produces acrylonitrile ($\text{CH}_2 = \text{CHCN}$)?



569. Gasoline is:

a) C_3H_8 to C_6H_{14}

b) C_7H_{16} to $\text{C}_{10}\text{H}_{22}$

c) C_7H_{24} to $\text{C}_{14}\text{H}_{34}$

d) $\text{C}_{17}\text{H}_{36}$ to $\text{C}_{21}\text{H}_{50}$

570. Which of the following gives methane [CH_4] on hydrolysis?

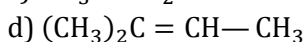
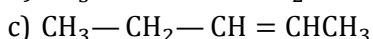
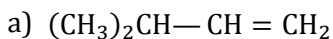
a) Fe_3O_4

b) Al_2O_3

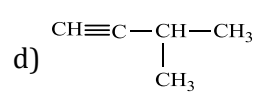
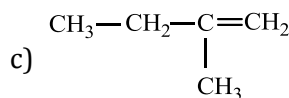
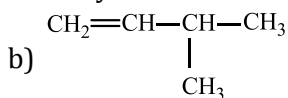
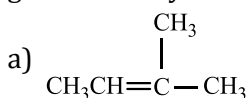
c) CaC_2

d) Al_4C_3

571. The compound $(\text{CH}_3)_2\text{CH}-\text{CHCl}-\text{CH}_3$ reacts with alcoholic KOH to give the following alkene:



572. A hydrocarbon reacts with HI to give (X) which on reacting with aqueous KOH forms (Y). Oxidation of (Y) gives 3-methyl-2-butanone. The hydrocarbon is:



573. Pure acetylene has sweet ethereal smell while impure smells like garlic due to presence of:

a) NH_3

b) PH_3

c) AsH_3

d) H_2S

574. An alkyl halide by formation of its Grignard reagent and heating with water yields propane. What is the original alkyl halide?

a) Methyl iodide

b) Ethyl iodide

c) Ethyl bromide

d) Propyl bromide

575. 1-propyne on treatment with dilute H_2SO_4 in presence of HgSO_4 gives acetone. The change is due to:

a) Hyperconjugation

b) Resonance

c) Tautomerism

d) None of these

576. O_2 required for complete oxidation of 1 litre of ethane at NTP is:

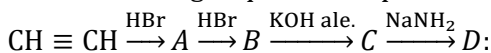
a) 3.5 litre

b) 0.156 mole

c) 5.00 g

d) All of these

577. In the following sequence the product D is,



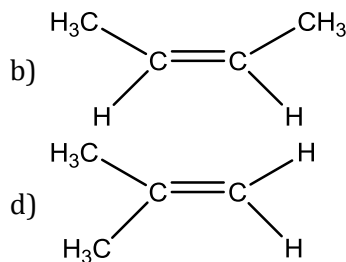
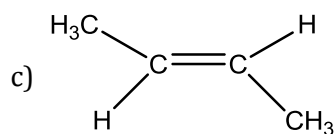
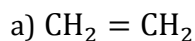
a) Ethanol

b) Ethane

c) Ethyne

d) Ethanal

578. Which of the following compounds react with HBr obeying Markownikoff's rule?



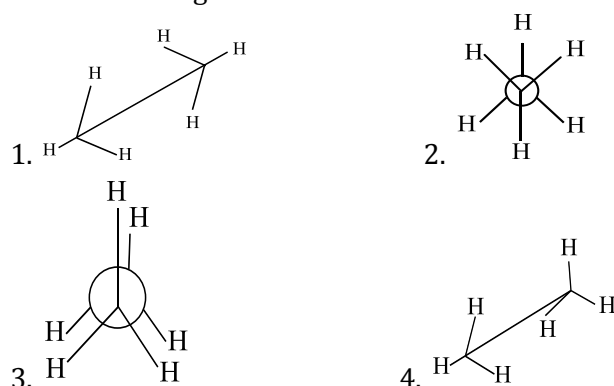
579. Liquid hydrocarbon can be converted to a mixture of gaseous hydrocarbon by:

- a) Oxidation
- b) Cracking
- c) Hydrolysis
- d) Distillation under reduced pressure

580. Two jars *A* and *B* are filled with hydrocarbons. Br_2 in CCl_4 is added to these jars. *A* does not decolourise the Br_2 solution but *B* decolourises. What are *A* and *B*?

- a) Alkane and alkene
- b) Alkene and alkane
- c) Alkene and alkyne
- d) None of these

581. In the following structures which two forms are staggered conformation of ethane?

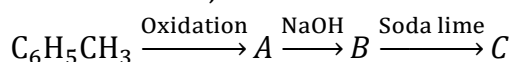


- a) 1 and 4
- b) 2 and 3
- c) 1 and 2
- d) 1 and 3

582. A mixture of ethane, ethene and ethyne is passed through ammoniacal AgNO_3 solution. The gases which remain unreacted are:

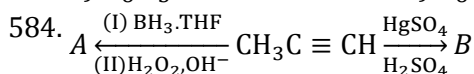
- a) Ethane and ethene
- b) Ethane and ethyne
- c) Ethene and ethyne
- d) Ethane only

583. In the reaction,



The product *C* is

- a) $\text{C}_6\text{H}_5\text{OH}$
- b) C_6H_6
- c) $\text{C}_6\text{H}_5\text{COONa}$
- d) $\text{C}_6\text{H}_5\text{ONa}$



Identify *A* and *B*

- a) $\text{CH}_3\text{CHO}, \text{CH}_3\text{COCH}_3$
- b) $\text{CH}_3\text{CH}_2\text{CHO}, \text{CH}_3\text{COCH}_3$
- c) $\text{CH}_3\text{CH}_2\text{CHO}, \text{CH}_3\text{COCH}_2\text{CH}_3$
- d) $\text{HCHO}, \text{CH}_3\text{COCH}_3$

585. Cyclobutadiene is said to be

- a) aromatic
- b) aliphatic
- c) non-aromatic
- d) None of these

586. Acetylene reacts with hypochlorous acid to form

- a) Cl_2CHCHO
- b) ClCH_2COOH
- c) Cl_3COCl
- d) ClCH_2CHO

587. To enable easy detection of gas leakage from cylinders, the substance added to L.P.G. is:

- a) Glycols
- b) Phenols
- c) Thioalcohols
- d) Glycerols

588. Octane no. of 2,3,3-trimethylbutane has been assumed to be:

- a) 100
- b) -45
- c) 124
- d) Zero

589. C_4H_6 may contain

- a) One double bond
- b) Two double bond
- c) One triple bond
- d) Both (b) and (c)

590. Which of the following compounds can form metallic derivatives?

- a) Ethane b) Propyne c) 2-butyne d) 2-butene

591. Increasing order of volatility of C_2H_6 , C_2H_4 , C_2H_2 and C_6H_6 is:

- a) C_6H_6 , C_2H_6 , C_2H_4 , C_2H_2 b) C_2H_2 , C_2H_4 , C_2H_6 , C_6H_6 c) C_6H_6 , C_2H_2 , C_2H_4 , C_2H_6 d) C_2H_2 , C_2H_6 , C_2H_4 , C_6H_6

592. Octane no. of a fuel can be increased by:

- a) Isomerism b) Alkylation c) Reforming d) All of these

593. 1-propanol on dehydration with H_2SO_4 produces:

- a) $CH_3 - CH = CH_2$
b) $CH_3 - CH = CH - CH_3$
c) $CH_3CH_2CH_2OCH_2CH_2CH_3$
d) $CH_3CH_2CH_2CH_2CH = CH_2$

594. Propadiene, C_3H_4 molecule contains:

- a) Two sp^2 and one sp -hybrid carbon
b) One sp^2 and two sp -hybrid carbons
c) One sp^2 and three sp -hybrid carbons
d) None of the above

595. Catalyst used in dimerization of acetylene to prepare chloroprene is:

- a) $HgSO_4 + H_2SO_4$ b) Cu_2Cl_2 c) $Cu_2Cl_2 + NH_4Cl$ d) $Cu_2Cl_2 + NH_4OH$

596. Cyclopentene on treatment with alkaline $KMnO_4$ gives:

- a) Cyclopentanol
b) *trans*-1,2-cyclopentanediol
c) *cis*-1,2-cyclopentanediol
d) 1 : 1 mixture of *cis*- and *trans*-1,2-cyclopentanediol

597. $C_7H_8 \xrightarrow{3Cl_2, Heat} A \xrightarrow{Fe/Br_2} B \xrightarrow{Zn/HCl} C$

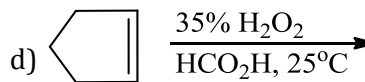
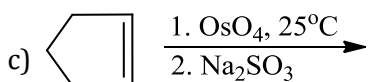
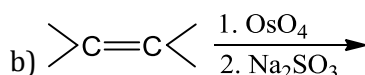
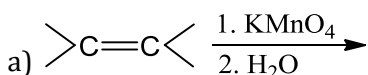
Here, the compound C is

- a) 3-bromo 2,4,5,6-trichlorotoluene b) *o*-bromo toluene
c) *p*-bromo toluene d) *m*-bromo toluene

598. Naphthalene is an example of

- a) Polynuclear hydrocarbon b) alicyclic compound
c) heterocyclic compound d) aliphatic compound

599. Which of the following will give *trans*-diols?



600. Benzene can react with

- a) Bromine water b) HNO_3 c) H_2O d) CH_3OH

601. A mixture of methane and steam when passes over nickel supported on alumina catalyst at $725^\circ C$ gives:

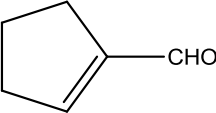
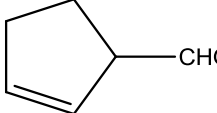
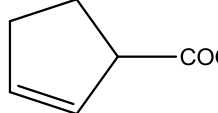
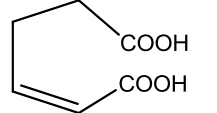
- a) CH_3OH b) CO_2 and H_2 c) CO and H_2 d) None of these

602. In which reaction addition takes place according to Markownikoff's rule?


- a) $CH_3CH = CH_2 + Br_2 \rightarrow$
b) $CH_3CH = CH_2 + HBr \rightarrow$
c) $CH_2 = CH_2 + HBr \rightarrow$
d) $CH_3CH = CHCH_3 + Br_2 \rightarrow$

603. Paraffin wax is:

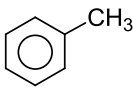
- a) Ester b) Alcohol c) Unsaturated hydrocarbon d) Saturated hydrocarbon

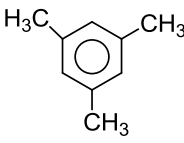
604. Propyne when passed through a hot iron tube at 400°C produces
a) Benzene
b) Methyl benzene
c) Dimethyl benzene
d) Trimethyl benzene
605. Which of the following is called Marsh gas?
a) C_2H_4
b) C_2H_6
c) C_2H_2
d) CH_4
606. Which can be easily oxidized?
a) Alkene
b) 1-alkyne
c) Alkane
d) Benzene
607. *n*-butane and isobutene, which have same number of hydrogen and carbon atoms in their molecules, boil at different temperatures because:
a) *n*-butane is much hotter
b) Their volumes are different
c) Isobutene is an alkene
d) Their atoms are not having the same carbon chain
608. Common oxidizing agents used in organic chemistry are:
a) Fenton's reagent
b) Osmium tetroxide
c) Acidified $KMnO_4$
d) Alkaline $KMnO_4$
609. Acetylenic hydrocarbons are acidic because:
a) Sigma electron density of C—H bond in acetylene is nearer a carbon which has 50% *s*-character
b) Acetylene has only one hydrogen atom at each carbon atom
c) Acetylene contains least number of hydrogen atoms among the possible
d) Acetylene belongs to the class of alkynes with formula C_nH_{2n-2}
610. Butene -1 may be converted to butane by the reaction with:
a) Zn—Hg
b) Pd— H_2
c) Zn—HCl
d) Sn—HCl
611. Number of acidic hydrogen atom in butyne-1 is:
a) 2
b) 3
c) 1
d) 4
612. Propene on reaction with methylene iodide in presence of Zn-Cu couple gives:
a) Cyclopropane
b) Cyclopropene
c) Methyl cyclopropane
d) Cyclobutene
613. Addition of O_2 on ethylene in presence of Ag at 200°C forms:
a) Epoxy ethane
b) Oxiranes
c) Cyclic ethers
d) All of these
614. The carbon-carbon bond distance in benzene is
a) Longer than a C — C single bond
b) Longer than a C = C double bond
c) Shorter than a C = C double bond
d) Shorter than a C \equiv C triple bond
615. Method of converting high boiling hydrocarbons into low boiling hydrocarbons is called:
a) Polymerisation
b) Isomerisation
c) Cracking
d) Condensation
616. The mechanism of Wurtz reaction involves:
a) Free radical
b) Carbocation
c) Carbanion
d) None of these
617. The most important energy yielding constituent in biogas is:
a) C_2H_4
b) C_2H_2
c) CH_4
d) H_2S
618. PVC is a polymer of:
a) $CH_2 = CH_2$
b) $ClCH_2 - CH_2Cl$
c) $CH_2 - CHCl$
d) $Cl - C = C - Cl$
619. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound *E*. Compound *E* on further treatment with aqueous KOH yields compound *F*. Compound *F* is
- a)  b)  c)  d) 
620. The flash point in India is fixed at:
a) 44°C
b) 35°C
c) 22.8°C
d) 30°C
621. Lindlar's catalyst is:
a) Pd- $CaCO_3$ deactivated by lead acetate
b) Pd — $BaSO_4$

- c) Pd
d) None of the above
622. The energy of π -bond in kcal is about :
a) 36 b) 50 c) 74 d) 140
623. Ozonolysis (O_3, H_2O) of,
 $CH_3-CH-C\equiv C-CH_3$ gives:
 $\begin{array}{c} | \\ CH_3 \\ CH_3-CHCOOH + CH_3COOH \end{array}$
 a) $\begin{array}{c} | \\ CH_3 \\ CH_3-CHCHO + CH_3CHO \end{array}$
 b) $\begin{array}{c} | \\ CH_3 \\ CH_3-CHCHO + CH_3COOH \end{array}$
 c) $\begin{array}{c} | \\ CH_3 \end{array}$
 d) None of the above
624. What is the end product of the following sequences of operations?
 $CaC_2 \xrightarrow{H_2O} A \xrightarrow[Hg^{2+}]{Dil. H_2SO_4} B \xrightarrow[H_2]{Ni} C$
 a) Methyl alcohol b) Acetaldehyde c) C_2H_5OH d) C_2H_4
625. The order of relative acidic strengths of water, ethyne and propyne is:
 a) Water > propyne > ethyne
 b) Propyne > ethyne > water
 c) Water > ethyne > propyne
 d) Ethyne > water > propyne
626. Reaction of *trans*-2-phenyl-1-bromocyclopentane on reaction with alcoholic KOH produces:
 a) 4-phenylcyclopentene
 b) 2-phenylcyclopentene
 c) 1-phenylcyclopentene
 d) 3-phenylcyclopentene
627. Ethylene reacts with sulphur monochloride to give:
 a) Phosgene b) Mustard gas c) Ethylene chloride d) None of these
628. The dihalogen derivative 'X' of a hydrocarbon with three carbon atoms reacts with alcoholic KOH and produces another hydrocarbon which forms a red precipitate with ammoniacal Cu_2Cl_2 . 'X' gives an aldehyde on reaction with aqueous KOH. The compound 'X' is
 a) 1,3-dichloropropane b) 1,2-dichloropropane
 c) 2,2-dichloropropane d) 1,1-dichloropropane
629. Ethylene may be prepared by the dehydration of:
 a) Ethyl alcohol b) Methyl alcohol c) Acetic acid d) Oxalic acid
630. Petroleum is formed by the chemical changes in:
 a) Inorganic matter b) Vegetable matter c) Animal matter d) Both (b) and (c)
631. Common dehydrating agents for alkanes are:
 a) H_2SO_4 b) Al_2O_3 c) $ZnCl_2$ d) All of the above
632. The most stable conformation of butane is:
 a) Skew b) Staggered c) Gauche d) Eclipsed
633. A cyclic hydrocarbon molecule has all the carbon and hydrogen in a single plane. All the carbon-carbon bonds are of same length, less than 1.54 \AA , but more than 1.34 \AA . The C-c bond angle will be

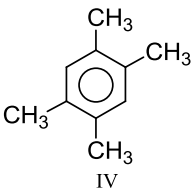
- a) $109^{\circ}28'$ b) 100° c) 180° d) 120°
634. The product of acid catalysed hydration of 2-phenyl propene is:
a) 3-phenyl-2-propanol b) 1-phenyl-2-propanol c) 2-phenyl-2-propanol d) 2-phenyl-1-propanol
635. When C_2H_5 , CH_4 and C_2H_4 passes through a test tube which have ammoniacal Cu_2Cl_2 , find out which gas comes out unaffected from test tube?
a) C_2H_2 and CH_4 b) C_2H_2 and C_2H_4 c) C_2H_4 and CH_4 d) C_2H_2
636. Benzene reacts with chlorine in sunlight to give a final product
a) CCl_4 b) $C_6H_6Cl_6$ c) C_6Cl_6 d) C_6H_5Cl
637. When 2-butyne is treated with $Pd - BaSO_4$; the product formed will be
a) *cis*-2-butene b) *trans*-2-butene c) 1-butene d) 2-hydroxy butane
638. The overlapping of orbitals in benzene is of the type
a) $sp - sp$ b) $p - p$ c) $sp^2 - sp^2$ d) $sp^3 sp^3$
639. The product obtained when methyl magnesium bromide reacts with methyl alcohol is:
a) Acetone b) Alcohol c) Methane d) Ethane
640. The treatment of benzene with benzoyl chloride in the presence of $AlCl_3$ gives
a) Benzaldehyde b) Benzophenone c) Diphenyl d) Cyclohexane
641. Which of the following have delocalised electron?
a) Benzene b) Cyclohexane c) CH_4 d) C_2H_6
642. The IUPAC name of $CH_2 = CH - CH_2$ —group is:
a) Allyl b) Propyl c) Prop-2-enyl d) Prop-1-enyl
643. Which statement is correct?
a) Low chemical reactivity of alkanes is due to strong C—C and C—H bonds
b) Alkanes show characteristic substitution reactions because they are saturated
c) Reaction of alkanes with fluorine is explosive even in dark
d) All of the above
644. Ease of sulphonation of alkanes is:
a) $3^{\circ} > 2^{\circ} > 1^{\circ}$ b) $1^{\circ} > 2^{\circ} > 3^{\circ}$ c) $2^{\circ} > 3^{\circ} > 1^{\circ}$ d) $3^{\circ} > 1^{\circ} > 2^{\circ}$
645. Arrange the following in order of decreasing boiling point
- 

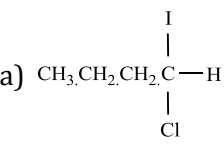
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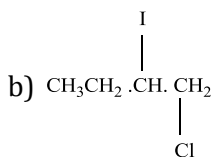
II
- 

III



IV
- a) $I > II > III > IV$ b) $IV > III > II > I$ c) $I > III > IV > II$ d) $II > III > I > IV$
646. The product B is:
 $CH_3.CH_2.C = CH + HCl \xrightarrow{HI} B \rightarrow C$
- 

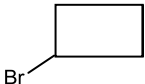
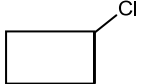


a)



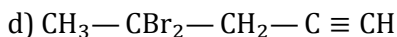
b)

c) $CH_3CH_2C \equiv CH$

d) $CH_3CH=CHCH_3$
647. *n*-propyl bromide on treating with alcoholic KOH produces
a) Propane b) Propene c) Propyne d) Propanol
648. An unsaturated hydrocarbon upon ozonolysis gives one mole each of formaldehyde, acetaldehyde and methylglyoxal(CH_3COCHO). The structure of the hydrocarbon is
a) $CH_2 = CH - CH_2 - CH = CH_2$ b) $CH_2 = CH - C(CH_3) = CH - CH_3$

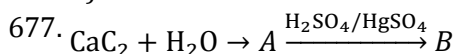
- c) $(\text{CH}_3)_2\text{C} = \text{CH} - \text{CH}_3$ d) $\text{CH}_3 - \text{CH} = \text{C}(\text{CH}_3) - \text{CH}_3$
649. Fischer-Tropsch process is used in the manufacture of:
 a) Synthetic petrol b) Ethanol c) Benzene d) Ethanoic acid
650. 2-methylpropene is isomeric with butane-1. They can be distinguished by:
 a) Baeyer's reagent b) Ammoniacal AgNO_3 c) Br_2 solution d) $\text{O}_3, \text{Zn}/\text{H}_2\text{O}$
651. Acetylene reacts with 42% H_2SO_4 containing 1% HgSO_4 to give:
 a) $\text{C}_2\text{H}_5\text{HSO}_4$ b) CH_3CHO c) HCHO d) $\text{CH}_2 = \text{CH}_2$
652. The simplest alkyne is:
 a) CH b) CH_2 c) C_2H_2 d) C_2H_4
653. A Friedel-Crafts reaction of benzene with chloroform produces
 a) $\text{C}_6\text{H}_5\text{CHCl}_2$ b) $\text{C}_6\text{H}_5-\overset{\text{Cl}}{\underset{\text{H}}{\text{C}}}-\text{C}_6\text{H}_5$ c) $\text{C}_6\text{H}_5-\overset{\text{C}_6\text{H}_5}{\underset{\text{H}}{\text{C}}}-\text{C}_6\text{H}_5$ d) All of these
654. An alkene, obtained by the dehydration of an alcohol (A), on ozonolysis gives two molecules of acetaldehyde for every molecule of alkene. The alcohol (A) is:
 a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ b) $\text{CH}_3\text{CH}_2\text{OH}$ c) $\text{CH}_3\text{CH} = \text{CHCH}_2\text{OH}$ d) $\text{CH}_3\text{CH}_2\underset{\text{OH}}{\underset{|}{\text{CH}}}\text{CH}_3$
655. Which of the following annulenes is *anti*-aromatic?
 a) Benzene b) Cyclobutadiene c) Cyclodecapentene d) Cyclooctatetraene
656. The number of possible isomers of alkane with formula C_6H_{14} is:
 a) 2 b) 3 c) 4 d) 5
657. Which statement is correct?
 a) Alkanes from CH_4 to C_4H_{10} are colourless odourless gases
 b) Alkanes from C_5H_{12} to $\text{C}_{17}\text{H}_{36}$ are colourless liquids
 c) All alkanes are lighter than water
 d) Melting point of alkanes increases with increase in the number of carbon atoms
658. Which compound does not decolourize bromine dissolved in carbon tetrachloride?
 a) C_2H_2 b) C_3H_6 c) C_6H_6 d) C_2H_4
659. The principal organic product formed in the reaction,
 $\text{CH}_2 = \text{CH}(\text{CH}_2)_8\text{COOH} + \text{HBr} \xrightarrow{\text{Peroxide}} \dots$ is:
 a) $\text{CH}_3 - \text{CHBr}(\text{CH}_2)_8\text{COOH}$
 b) $\text{CH}_2 = \text{CH}(\text{CH}_2)_8\text{COBr}$
 c) $\text{CH}_2\text{BrCH}_2(\text{CH}_2)_8\text{COOH}$
 d) $\text{CH}_2 = \text{CH}(\text{CH}_2)_7\text{CHBrCOOH}$
660. What would be the product formed when 1-bromo-3-chlorocyclobutane reacts with two equivalents of metallic sodium in ether?
 a)  b)  c)  d) 
661. $[A] \xleftarrow[\text{catalyst}]{\text{Lindlar's}} \text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow[\text{liq. NH}_3]{\text{Na in}} [B]$
 [A] and [B] are respectively
 a) *cis*, *trans*-2-butene b) Both *trans*-2-butene
 c) *trans*, *cis*-2-butene d) Both *cis*-2-butene
662. Which of the following reacts with KMnO_4 but does not react with AgNO_3 ?
 a) C_2H_6 b) CH_4 c) C_2H_4 d) C_2H_2
663. Octane number 116 is given for:

- a) 2,2,2-trimethyl pentane
 b) 2,3,4-trimethyl pentane
 c) 2,2,3-trimethyl butane
 d) 2,2,4-trimethyl butane
664. Which of the following statements is incorrect?
 a) Acetylene is explosive above 2 atm
 b) It is transported by dissolving in acetone
 c) It has unpleasant garlic odour
 d) It is used in the manufacture of Lewisite
665. Formation of ethylene from ethyl bromide is a case of:
 a) Addition reaction
 b) Substitution reaction
 c) Elimination reaction
 d) Rearrangement reaction
666. The most stable alkene is,
 a) $R_2C = CR_2$ b) $RCH = CHR$ c) $CH_2 = CH_2$ d) $RCH = CR_2$
667. Ethylene can be prepared by electrolysis of an aqueous solution of:
 a) Sodium acetate b) Sodium succinate c) Sodium fumarate d) Sodium propionate
668. HBr reacts with $CH_2 = CH - OCH_3$ under anhydrous conditions at room temperature to give
 a) CH_3CHO and CH_3Br b) $BrCH_2CHO$ and CH_3OH
 c) $BrCH_2 - CH_2 - OCH_3$ d) $H_3C - CHBr - OCH_3$
669. Identify Z in the following series?
 $CH_2 = CH_2 \xrightarrow{HBr} X \xrightarrow[\text{I}_2 \text{ excess}]{\text{Hydrolysis}} Y \xrightarrow{Na_2CO_3} Z$
 a) C_2H_5I b) CHI_3 c) CH_3CHO d) C_2H_5OH
670. Reactive species in halogenation of benzene in cold and dark
 a) Cl^\bullet b) Cl^+ c) Cl^- d) None of these
671. An organic alkadiene on reductive ozonolysis produces
 (i)acetaldehyde
 (ii)acetone
 (iii)2-methylpropane-1, 3-dial
 The formula of alkadiene will be
 $CH_3C = CHCHCH = CHCH_3$
 a) $\begin{array}{cc} | & | \\ CH_3 & CH_3 \\ CH_3C = CHCHC = CHCH_3 \end{array}$
 b) $\begin{array}{cc} | & | \\ CH_3 & CH_3 \\ CH_3CHCH = CCH = CHCH_3 \end{array}$
 c) $\begin{array}{cc} | & | \\ CH_3 & CH_3 \\ CH_3C = CHCHC = CHCH_3 \end{array}$
 d) $\begin{array}{cc} | & | \\ CH_3 & CH_3 \\ CH_3CH_2CHCH = CHC = CH_2 \end{array}$
672. Synthetic petrol and kerosene can be obtained by passing.....under heat and pressure over coal.
 a) O_2 b) H_2 c) N_2 d) CO_2
673. A hydrocarbon containing 2 carbon atoms give Sabatier and Senderen's reaction but does not give precipitate with ammoniacal silver nitrate solution. The hydrocarbon in question is:
 a) Ethane b) Acetylene c) Ethylene d) None of these
674. Acetylene can be converted to higher alkyne using the following sequence of reactions:
 a) Na, RX b) $RMgX, R'X$ c) Either of these two d) None of these
675. At low temperature, the slow addition of molecular bromine to $H_2C = CH - CH_2 - C \equiv CH$ gives:
 a) $CH_2 = CH - CH_2 - CBr = CHBr$
 b) $BrCH_2 - CHBr - CH_2 - C \equiv CH$
 c) $H_2C = CH - CH_2 - CH_2 - CBr_3$



676. Which of the following statement is correct?

- a) Benzene has a tetrahedral geometry like an alkane
- b) Benzene is aromatic while naphthalene is not
- c) Benzene and Cyclohexane are both aromatic
- d) Benzene behaves more like an alkane than an alkene

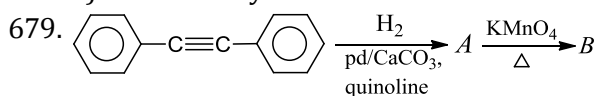


Identify A and B in the given reaction

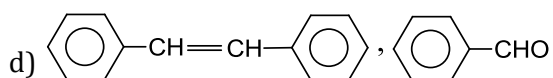
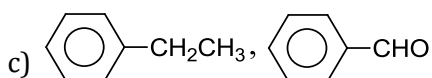
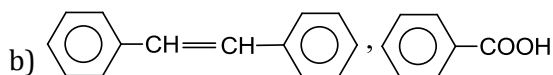
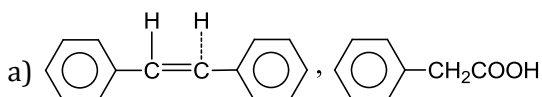
- a) C_2H_2 and CH_3CHO
- b) CH_4 and HCOOH
- c) C_2H_4 and CH_3COOH
- d) C_2H_2 and CH_3COOH

678. The correct boiling point order for corresponding hydrocarbons is:

- a) Alkyne > alkane > alkene
- b) Alkane > alkene > alkyne
- c) Alkyne > alkene > alkane
- d) Alkene > alkyne > alkane



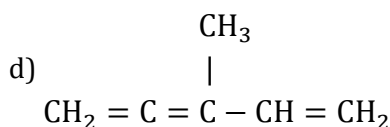
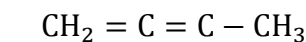
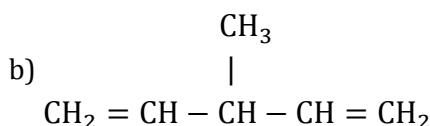
Identify A and B



680. Electrolysis of cold concentrated aqueous solution of potassium methyl succinate yields:

- a) Ethane
- b) Ethyne
- c) Propene
- d) Ethane-1,2-diol

681. An alkene gives two moles of HCHO , one mole of CO_2 and one mole of CH_3COCHO on ozonolysis. What is its structure?



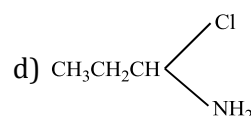
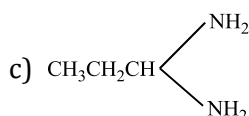
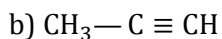
682. Alkyl halides get converted to alkenes through:

- a) Electrophilic substitution
- b) Nucleophilic addition
- c) Elimination reaction
- d) Hydrolysis

683. In the complete combustion of $\text{C}_n\text{H}_{2n+2}$, the number of oxygen moles required is:

- a) $\left(\frac{n}{2}\right) \text{O}_2$
- b) $\left(\frac{n+1}{2}\right) \text{O}_2$
- c) $\left(\frac{3n+1}{2}\right) \text{O}_2$
- d) $\left(\frac{n+2}{2}\right) \text{O}_2$

684. When $\text{CH}_3\text{CH}_2\text{CHCl}_2$ is treated with NaNH_2 the product formed is:



685. Cycloalkanes are isomeric with

- a) Alkanes
- b) Alkenes
- c) Alkynes
- d) Arenes

686. Which gives only one monosubstitution product on chlorination?

- a) *n*-pentane b) Neopentane c) Isopentane d) *n*-butane
687. The products obtained via oxymercuration ($\text{HgSO}_4 + \text{H}_2\text{SO}_4$) of 1-butyne would be:
- a) $\text{CH}_3\text{CH}_2\text{COCH}_3$
 b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$
 c) $\text{CH}_3\text{CH}_2\text{CHO} + \text{HCHO}$
 d) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$
688. $\begin{array}{c} R \\ \diagdown \\ \text{C}=\text{O} \\ \diagup \\ R \end{array}$ is not converted to $\begin{array}{c} R \\ \diagdown \\ \text{CH}_2 \\ \diagup \\ R \end{array}$ by:
- a) Wolff-Kishner reaction b) Clemmensen reduction c) Red P+HI at 200°C d) Wurtz reaction
689. The presence of the chlorine atom on benzene ring makes the second substituent enter at a position
- a) *ortho* b) *meta* c) *para* d) *ortho/para*
690. Two organic compounds (*A*) and (*B*) both containing only carbon and hydrogen, on quantitative analysis gave the same percentage composition by weight
- $\text{C} = \left(\frac{12}{12}\right) \times 100\%$, $\text{H} = \left(\frac{1}{13}\right) \times 100\%$
- A* decolourises bromine water but *B* does not. *A* and *B* respectively are
- a) C_2H_2 and C_6H_6 b) C_6H_6 and C_2H_2 c) C_2H_4 and C_2H_6 d) C_2H_2 and C_2H_6
691. Which of the following compounds react with, an aqueous solution of $\text{Ag}(\text{NH}_2)_2\text{OH}$?
- a) ethane b) Ethene c) 1-butyne d) 2-butyne
692. Aromatisation of *n*-heptane by passing over ($\text{Al}_2\text{O}_3 + \text{Cr}_2\text{O}_3$) catalyst at 773 K gives
- a) Benzene b) Toluene c) Mixture of both d) Heptylene
693. In a mixture of *n*-hexadecane and α -methylnaphthalene the percentage of the latter is 10. The value of cetane number is:
- a) 110 b) 90 c) 10 d) Zero
694. Addition of bromine to 1,3-butadiene gives:
- a) 1,2-addition product only
 b) 1,4-addition product only
 c) Both 1,2 and 1,4-addition products
 d) No reaction
695. $\text{R}-\text{COOH} \rightarrow \text{RCH}_2\text{OH}$. This mode of reduction can be effected only by:
- a) NaBH_4 b) $\text{Na} + \text{Alcohol}$ c) LiAlH_4 d) All of these
696. A Wittig reaction with an aldehyde gives
- a) Ketone compound b) A long chain fatty acid
 c) Olefin compound d) Epoxide
697. Ethylene di bromide on heating with metallic sodium in ether solution yields
- a) Ethene b) Ethylene c) 2-butene d) 1-butene
698. When alcoholic solution of ethylene dibromide is heated with granulated zinc, the compound formed is:
- a) Ethane b) Ethylene c) Butane d) Isobutene
699. Octane number is:
- a) Number of carbon atoms in octane
 b) Number of molecules of octane formed in cracking of 1.0g of gasoline
 c) Number of hydrogen atoms in octane
 d) Number for representing standard rating of fuel
700. When an aqueous solution containing sodium acetate and sodium propionate is electrolysed we get:
- a) Ethane b) Propane c) Butane d) All of these
701. Which one of the following methods is neither meant for the synthesis nor for separation of amines?

- a) Curtius reaction b) Wurtz reaction c) Hofmann method d) Hinsberg method
702. *Vic*-dihalide on treatment with zinc dust gives:
 a) Alkane b) Alkene c) Alkyne d) All of these
703. Identify the substitute group, that acts as *ortho* – *para* director, during electrophilic substitution in aromatic compounds.
 a) $-\text{NH}_2$ b) $-\text{NO}_2$ c) $-\text{SO}_3\text{H}$ d) N_2
704. Order of acidity of H_2O , NH_3 and acetylene is:
 a) $\text{NH}_3 > \text{CH} \equiv \text{CH} > \text{H}_2\text{O}$
 b) $\text{H}_2\text{O} > \text{NH}_3 > \text{CH} \equiv \text{CH}$
 c) $\text{H}_2\text{O} > \text{CH} \equiv \text{CH} > \text{NH}_3$
 d) $\text{NH}_3 > \text{H}_2\text{O} > \text{CH} \equiv \text{CH}$
705. $\text{C}_2\text{H}_5\text{I} + \text{C}_5\text{H}_{11}\text{I} + 2\text{Na} \xrightarrow{\text{Ether}} \text{C}_2\text{H}_5-\text{C}_5\text{H}_{11} + 2\text{NaI}$
 The above equation represents:
 a) Hofmann's reaction
 b) Dow's reaction
 c) Wurtz synthesis
 d) Reimer-Tiemann's reaction
706. Identify Z in the sequence,
 $\text{CH}_3 - \text{CH}_2 - \text{CH} = \text{CH}_2 \xrightarrow{\text{HBr}/\text{H}_2\text{O}_2} \text{Y} \xrightarrow{\text{C}_2\text{H}_5\text{O}^- - \text{Na}^+} \text{Z} :$
 a) $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{O} - \text{CH}_2 - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$
 b) $\begin{array}{c} \text{CH}_3 - \text{CH}_2 - \text{CH} - \text{O} - \text{CH}_2 - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$
 c) $\text{CH}_3 - (\text{CH}_2)_3 - \text{O} - \text{CH}_2 - \text{CH}_3$
 d) $\text{CH}_3 - (\text{CH}_2)_4 - \text{O} - \text{CH}_3$
707. Which will give cyclooctyne when treated with base?
 a) 1,2-dibromocyclobutane
 b) 1,1-dibromocyclobutane
 c) 1,1-dibromocyclooctane
 d) 1,2-dibromocyclopropane
708. The final product in following sequence of reaction is
 $\text{CH} \equiv \text{CH} \xrightarrow{\text{NaNH}_2} \text{A} \xrightarrow{\text{CH}_3\text{Br}} \text{B}$
 a) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$ b) $\text{HC} \equiv \text{C} - \text{CH}_3$
 c) $\text{CH}_2 = \text{CH} - \text{CH}_3$ d) $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$
709. What are the products obtained upon the ozonolysis of pent-2-ene?
 a) $\text{CH}_3\text{CH}_2\text{CHO}$ b) CH_3CHO c) CH_3COCH_3 d) Both (a) and (b)
710. Addition of halogen acid occurs at slowest rate in:
 a) $\text{CH}_2 = \text{CHCl}$ b) $\text{CH}_2 = \text{CH}_2$ c) $\text{CH}_3 - \text{CH} = \text{CH}_2$ d) $(\text{CH}_3)_2\text{C} = \text{CH}_2$
711. Benzyl chloride ($\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$) can be prepared from toluene by chlorination with
 a) SO_2Cl_2 b) SOCl_2 c) Cl_2 d) NaOCl
712. The Markownikoff's rule is the best applicable to the reaction between
 a) $\text{C}_2\text{H}_4 + \text{HCl}$ b) $\text{C}_3\text{H}_6 + \text{Br}_2$ c) $\text{C}_3\text{H}_6 + \text{HBr}$ d) $\text{C}_3\text{H}_8 + \text{Cl}_2$
713. Which of the following acid reacts to reverse the Markownikoff's rule?
 a) HCl b) HBr c) HF d) HI
714. The addition of HOCl on alkenes in presence of strong acids to form halohydrins proceeds via formation of:
 a) Chloronium ion b) Carbocation c) Chloro carbocation d) None of these
715. On treatment with chlorine in presence of sunlight, toluene gives the product

a) *o*-chloro toluene

c) *p*-chloro toluene

b) 2,5-dichloro toluene

d) Benzyl chloride

716. The most oxidized form of hydrocarbon RCH_3 is:

a) CO_2

b) $RCHO$

c) $RCOOH$

d) $RCOCOOH$

717. Ethylene is used for:

a) Ripening of food

b) Preparing ethylene oxide

c) For preparing ethylene chloride

d) All are correct

: ANSWER KEY :

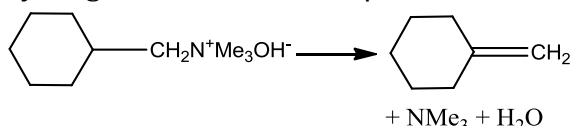
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5)	b	6)	c	7)	d	8)	c	193)	b	194)	c	195)	b	196)	a
9)	d	10)	c	11)	a	12)	a	197)	a	198)	c	199)	d	200)	d
13)	b	14)	b	15)	a	16)	b	201)	b	202)	d	203)	a	204)	b
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25)	b	26)	a	27)	b	28)	c	213)	c	214)	b	215)	a	216)	c
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149)	a	150)	a	151)	b	152)	a	337)	d	338)	b	339)	d	340)	b
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161)	b	162)	a	163)	c	164)	c	349)	c	350)	a	351)	c	352)	b
165)	c	166)	c	167)	c	168)	c	353)	b	354)	c	355)	a	356)	b
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181)	b	182)	a	183)	b	184)	b	369)	b	370)	d	371)	a	372)	d
185)	c	186)	b	187)	b	188)	b	373)	c	374)	c	375)	c	376)	b

377)	a	378)	c	379)	d	380)	d	581)	c	582)	a	583)	b	584)	b
381)	b	382)	b	383)	d	384)	b	585)	c	586)	a	587)	c	588)	c
385)	d	386)	c	387)	a	388)	b	589)	d	590)	b	591)	b	592)	d
389)	a	390)	a	391)	a	392)	a	593)	a	594)	a	595)	c	596)	c
393)	c	394)	b	395)	c	396)	d	597)	d	598)	a	599)	d	600)	b
397)	a	398)	c	399)	b	400)	a	601)	a	602)	b	603)	d	604)	d
401)	b	402)	d	403)	a	404)	a	605)	d	606)	b	607)	d	608)	f
405)	d	406)	c	407)	c	408)	d	609)	a	610)	b	611)	c	612)	c
409)	b	410)	d	411)	b	412)	a	613)	d	614)	b	615)	c	616)	a
413)	c	414)	d	415)	b	416)	c	617)	c	618)	c	619)	a	620)	a
417)	b	418)	d	419)	c	420)	c	621)	a	622)	b	623)	a	624)	c
421)	c	422)	b	423)	c	424)	b	625)	c	626)	c	627)	b	628)	d
425)	a	426)	d	427)	d	428)	a	629)	a	630)	d	631)	d	632)	b
429)	a	430)	c	431)	a	432)	c	633)	d	634)	c	635)	c	636)	b
433)	b	434)	b	435)	c	436)	a	637)	a	638)	c	639)	c	640)	b
437)	a	438)	c	439)	a	440)	d	641)	a	642)	c	643)	d	644)	a
441)	c	442)	a	443)	d	444)	c	645)	a	646)	c	647)	b	648)	b
445)	a	446)	b	447)	a	448)	b	649)	a	650)	d	651)	b	652)	c
449)	b	450)	a	451)	d	452)	b	653)	c	654)	d	655)	b	656)	d
453)	d	454)	d	455)	b	456)	c	657)	f	658)	c	659)	c	660)	d
457)	c	458)	d	459)	a	460)	b	661)	a	662)	c	663)	c	664)	c
461)	c	462)	a	463)	c	464)	b	665)	c	666)	a	667)	b	668)	d
465)	c	466)	d	467)	d	468)	c	669)	b	670)	b	671)	a	672)	b
469)	b	470)	c	471)	b	472)	c	673)	c	674)	c	675)	b	676)	d
473)	d	474)	c	475)	d	476)	c	677)	a	678)	c	679)	b	680)	c
477)	a	478)	b	479)	a	480)	a	681)	d	682)	c	683)	c	684)	b
481)	c	482)	b	483)	c	484)	b	685)	b	686)	b	687)	a	688)	d
485)	b	486)	b	487)	b	488)	a	689)	d	690)	a	691)	c	692)	b
489)	c	490)	a	491)	a	492)	c	693)	b	694)	c	695)	d	696)	c
493)	d	494)	d	495)	d	496)	a	697)	c	698)	b	699)	d	700)	d
497)	a	498)	b	499)	d	500)	c	701)	b	702)	b	703)	a	704)	c
501)	d	502)	c	503)	b	504)	d	705)	c	706)	c	707)	c	708)	b
505)	b	506)	a	507)	b	508)	b	709)	d	710)	d	711)	c	712)	c
509)	b	510)	c	511)	c	512)	a	713)	b	714)	a	715)	d	716)	c
513)	c	514)	d	515)	b	516)	b	717)	d						
517)	d	518)	d	519)	b	520)	a								
521)	b	522)	a	523)	b	524)	d								
525)	b	526)	d	527)	b	528)	d								
529)	b	530)	a	531)	d	532)	b								
533)	b	534)	a	535)	a	536)	b								
537)	b	538)	c	539)	c	540)	a								
541)	d	542)	b	543)	c	544)	d								
545)	b	546)	b	547)	d	548)	d								
549)	a	550)	a	551)	c	552)	d								
553)	b	554)	b	555)	d	556)	d								
557)	a	558)	a	559)	d	560)	a								
561)	b	562)	d	563)	c	564)	a								
565)	a	566)	c	567)	d	568)	a								
569)	b	570)	d	571)	d	572)	b								
573)	b	574)	d	575)	c	576)	d								
577)	c	578)	d	579)	b	580)	a								

: HINTS AND SOLUTIONS :

1 (a)

The formation of the alkene in an elimination reaction is called Hofmann elimination (Thermal decomposition). Elimination of hydrogen occurs from the β -carbon. So,



2 (c)

Bees wax is myricyl palmitate, *i. e.*, $\text{C}_{15}\text{H}_{31}\text{COOC}_{30}\text{H}_{61}$.

3 (a)

The knocking order is:

Straight chain alkane > branched chain alkane > olefins > arenes.

4 (d)

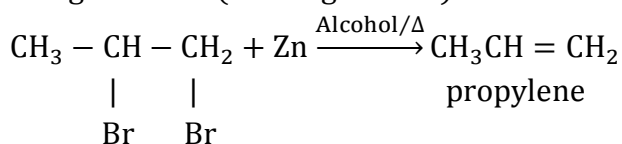
Follow peroxide effect.

5 (b)

Successive homologous differ by $-\text{CH}_2$ gp.

6 (c)

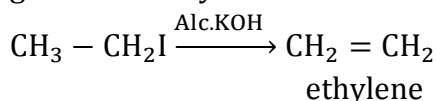
1, 2-dihalogen (*vicinal*) derivatives of the alkanes on reaction with zinc dust and methanol produces alkenes by loss of two halogen atoms (dehalogenation).



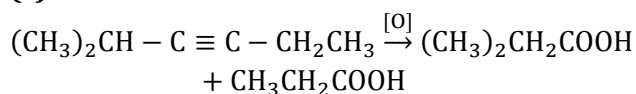
1,2-dibromopropane

7 (d)

Ethylene is formed by dehydrohalogenation of alkyl halide in presence of alcoholic KOH. Ethylene decolourise alkaline KMnO_4 due to get oxidized by it.

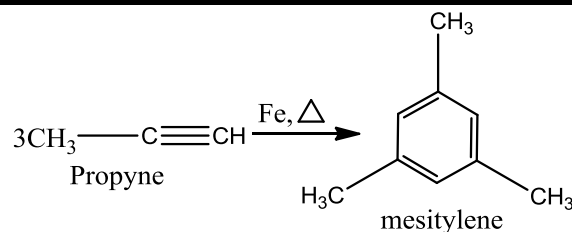


8 (c)

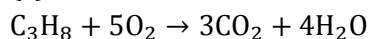


9 (d)

Benzene is obtained by the polymerisation of acetylene. Similarly, mesitylene is obtained by the polymerisation of propyne.



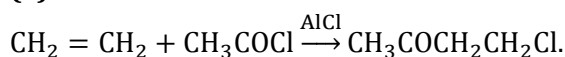
10 (c)



11 (a)

Follow cleavage of two bonds at multiple bonding position during ozonolysis.

12 (a)



13 (b)

It is a Corey House synthesis of alkanes.

14 (b)

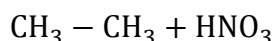
C_2H_2 is used for artificial ripening of fruits. C_2H_4 for natural ripening.

15 (a)

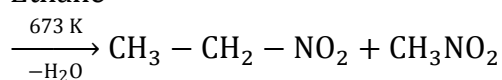
Follow Markownikoff's rule for addition.

16 (b)

Ethane gives a mixture of nitroethane and nitromethane.



Ethane



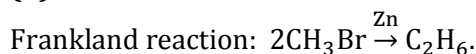
nitro ethane (minor)
(major)

During nitration chain fission of alkanes also takes place, so CH_3NO_2 is also obtained along with $\text{CH}_3\text{CH}_2\text{NO}_2$.

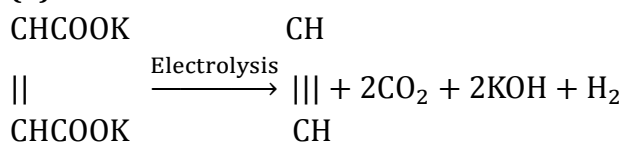
17 (d)

Coal gives coal gas.

19 (b)



20 (d)



cathode

Potassium maleate acetylene anode

21 (a)

F_2 reacts violently even in dark.

22 (d)
e. g., $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ is unsymmetrical.
 $\text{CH}_3\text{CH}=\text{CHCH}_3$ is symmetrical. Note the positions of carbon atoms on two sides of double bond.

23 (a)
Due to non-polar nature, alkanes are insoluble in water because water is a polar solvent.

24 (a)
 $(\text{a}) \text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow{\text{B}_2\text{H}_6}$
 $(\text{CH}_3 - \text{CH}_2 - \text{CH}_2)_3\text{B} \xrightarrow{\text{OH}^-} \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
Hydroboration of alkenes followed by hydrolysis in basic medium yield alcohol.
 $(\text{B}) \text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{I} \xrightarrow{\text{HI/P}} \text{CH}_3 - \text{CH}_2 - \text{CH}_3$
propane

Reduction of alkyl halides yield alkane.

(c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COONa} + \text{NaOH}$

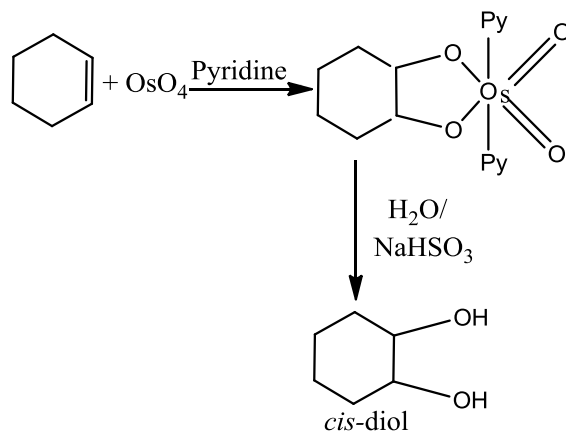
$\xrightarrow{\text{CaO}} \text{CH}_3\text{CH}_2\text{CH}_3 + \text{Na}_2\text{CO}_3$

Propane

Decarboxylation of sodium salt of fatty acid yield alkane having one carbon atom less than parent acid salt.

25 (b)
Nitrating mixture is conc. HNO_3 + conc. H_2SO_4 .
It produces NO_2^+ electrophile which carried out electrophilic substitution reaction.

26 (a)
 OsO_4 is a valuable oxidising agent. It oxidises alkenes to give *cis* - diols.



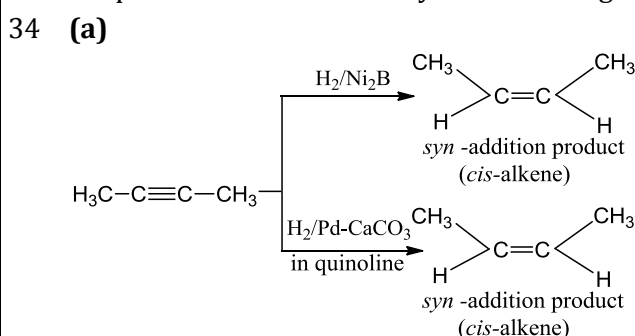
27 (b)
 Al_4C_3 on hydrolysis gives methane gas.
 $\text{Al}_4\text{C}_3 + 12\text{H}_2\text{O} \rightarrow 4\text{Al}(\text{OH})_3 + 3\text{CH}_4$

29 (c)
Vegetable oils are esters of glycerol or glycerides.

31 (c)
As the conjugation increases, heat of hydrogenation decreases. Thus, alkene (c) with two isolated double bonds has the highest heat of hydrogenation.

32 (c)
 $\text{CH}_3\text{CH}_2\text{CH}_3 \xrightarrow{400-600^\circ\text{C}} \text{CH}_2 = \text{CH}_2 + \text{CH}_4$
(X) (Y)

33 (a)
The position of the double bond in alkene is identified by ozonolysis. Bromine water is used to detect the presence of π -bond whereas ammoniacal silver nitrate AgNO_3 is used to detect the presence of terminal alkynes or -CHO group



While with Na/NH_3 or LiAlH_4 , *trans* alkene is obtained, *ie*, *anti*-addition product

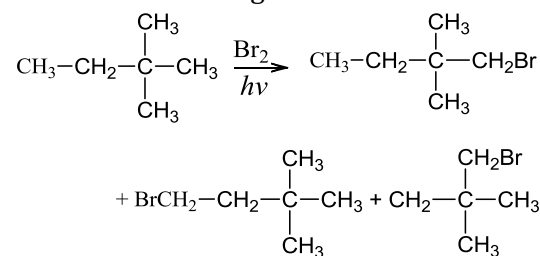
35 (d)
 $\text{H}_3\text{C} - \text{CH}_2\text{C} \equiv \text{CH} \xrightarrow[\text{NH}_4\text{OH}]{\text{AgNO}_3} \text{CH}_3\text{CH}_2\text{C} \equiv \text{CAg}$
(1-butyne) (silver-1 butynide)

$\text{H}_3\text{C} - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow[\text{NH}_4\text{OH}]{\text{AgNO}_3}$ No reaction
2-butyne

36 (d)

- $\text{CH}_3\text{COONa} \xrightarrow{\text{Soda lime}} \text{CH}_4$
 $\text{Al}_4\text{C}_3 + 12\text{H}_2\text{O} \rightarrow 4\text{Al(OH)}_3 + 3\text{CH}_4$
 $\text{CH}_3\text{I} \xrightarrow{2\text{H}} \text{CH}_4 + \text{HI}$
- 37 (d) Reaction of HBr with propene in the presence of peroxide gives *n*-propyl bromide. This addition reaction is an example of *anti*-Markownikoff's addition reaction. (*i.e.*, it is completed in form of free radical addition.)
- $\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{HBr} \xrightarrow{\text{Peroxide}} \text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{Br}$
n-propyl bromide
- 38 (d) Friedel-Craft reaction proceeds *via* most stable carbocation
- 39 (c) Follow text.
- 41 (a) The polymer is
- $\text{-(CH}_2\text{CH)}_n\text{-}$
 COOCH_3
- 42 (b) Symmetrical alkenes on ozonolysis give same product during ozonolysis.
- 43 (b) C_2H_2 is commercially named narylene.
- 44 (a)
- $\text{CH}_3\text{I} + 2\text{H} \xrightarrow[\text{or Zn-Cu/C}_2\text{H}_5\text{OH}]{\text{Zn+HCl}} \text{CH}_4 + \text{HI}$
 methane
 $\text{CH}_3\text{I} + 2\text{Na} + \text{ICH}_3 \xrightarrow{\text{Dry ether}} \text{CH}_3 - \text{CH}_3 + 2\text{NaI}$
 ethane
- 45 (d)
- $\text{CH}_3\text{COONa} + \text{NaOH} \xrightarrow{\text{CaO}} \text{CH}_4 + \text{Na}_2\text{CO}_3$
 82 g CH_3COONa gives 22.4 litre CH_4 .
- 46 (b)
- $2\text{CH}_3\text{I} + 2\text{Na} \xrightarrow{\text{Ether}} \text{C}_2\text{H}_6 + 2\text{NaI}$
- 48 (a) It is the name of reaction.
- 49 (c) Na/Liq. NH_3 or LiAlH_4 reduce hex-2-yne to trans-hex-2-ene.
- 50 (b) The number of di-and poly-halogenation products

depends upon (i) and the number of different types of hydrogens present in an alkane and (ii) the number of halogens introduced



- 51 (b)
- $\text{CH}_2 - \underset{\text{Br}}{\text{CH}}_2 \xrightarrow{\text{KOH alc.}} \text{CH}_2 = \text{CHBr} \xrightarrow{\text{NaNH}_2} \text{CH} \equiv \text{CH}$
 Vinyl bromide loses HBr only by strong base.
- 53 (a) General formula of cycloalkane is C_nH_{2n} .
- 54 (b) When alkene is passed over AlCl_3 , isomerisation takes place
- $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \xrightarrow[200^\circ\text{C}]{\text{AlCl}_3} \text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$
n-butane *iso*-butane
- 55 (b) According to Huckel's rule, the molecules which contain $(4n + 2)\pi$ -electrons are aromatic.
- 56 (a) $\text{AgC} \equiv \text{CAg}$ is white and $\text{CuC} \equiv \text{CCu}$ is red.
- 58 (a)
- $\text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_2 + \text{Ca(OH)}_2$
 ethyne
- 59 (c)
- $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH} + 2(\text{H}) \xrightarrow[\text{liq. NH}_3]{\text{Li}}$
 $\text{H}_3\text{C} \diagdown \text{C} = \text{C} \diagup \text{H}$
 $\text{H} \diagup \text{C} = \text{C} \diagdown \text{CH}_3$
trans -2-butene
 2-butyne
 But in presence of Lindlar's catalyst ($\text{Pd} - \text{CaCO}_3$) 2-butyne reacts with hydrogen giving *cis*-2-butene.
- $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH} + \text{H}_2 \xrightarrow{\text{Pd-CaCO}_3}$
 (2-butyne)
- $\text{H}_3\text{C} \diagdown \text{C} = \text{C} \diagup \text{CH}_3$
 $\text{H} \diagup \text{C} = \text{C} \diagdown \text{H}$
cis -2-butene
- 61 (d)

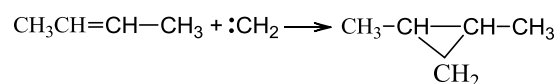
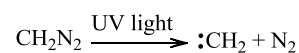
- 62 **(a)**
 $\text{CH}_3\text{CH}_2\text{C} \equiv \text{CH} \xrightarrow{[\text{O}]} \text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$
 Ethane is already a saturated compound.
- 63 **(d)**
 HIO_3 and HNO_3 both are oxidizing agent. HI is reducing agent which can reduce CH_3COCH_3 to propane,
 $\text{CH}_3 - \text{COCH}_3 + 4\text{HI} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_3 + \text{H}_2\text{O} + 2\text{I}_2$
- 64 **(a)**
 We know that
 $\text{CH}_3\text{CH}_2\text{Cl} + \text{KOH} \rightarrow \text{CH}_2 = \text{CH}_2 + \text{KCl} + \text{H}_2\text{O}$
 Thus, in this reaction ethene (C_2H_4) is produced.
- 65 **(b)**
 This reaction is utilized for the preparation of higher alkynes
 $\text{CH}_3 - \text{C} \equiv \text{C} - \text{H} + \text{Na} \xrightarrow{\text{Liq. NH}_3} \text{CH}_3 - \text{C} \equiv \text{C} - \text{Na}$
 Propyne
 $\text{CH}_3 - \text{C} \equiv \text{C} - \text{Na} + \text{BrCH}_3 \rightarrow \text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 + \text{NaBr}$
 But-2-yne
- 66 **(a)**
 B.P. increases with increase in mol. wt.
- 67 **(f)**
 These are common reductants.
- 68 **(d)**
 $\text{CH} \equiv \text{CH} \xrightarrow[\text{catalyst}]{\text{Lindlar's}} \text{CH}_2 = \text{CH}_2$
 Lindlar's catalyst prevents further reduction of ethane to ethane.
- 69 **(c)**
 Am. Cu_2Cl_2 gives red ppt. with alkyne.
- 70 **(d)**
 $(\text{C}_2\text{H}_5)_4\text{NOH} \xrightarrow{\Delta} (\text{C}_2\text{H}_5)_3\text{N} + \text{C}_2\text{H}_4 + \text{H}_2\text{O}$
- 72 **(d)**
 Ozonolysis involves the breaking of double bond and insertion of O atoms in place of double bond. Therefore, the structure of alkene is as

$$\begin{array}{c} \text{H}_3\text{C}-\text{C}=\text{C}-\text{CH}_3 \\ | \qquad \qquad | \\ \text{H} \qquad \qquad \text{H} \end{array} \xrightarrow[\text{O}_3/\text{H}_2\text{O}]{-\text{O}_2} \begin{array}{c} \text{H}_3\text{C}-\text{CHO} + \text{O}=\text{C}-\text{CH}_3 \\ \text{acetaldehyde} \end{array}$$

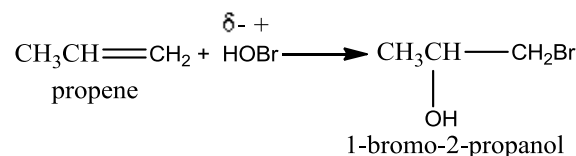
$$\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CH}_3$$

 2-butene
- 74 **(b)**
 Alkenes on treatment with diazomethane (CH_2N_2) in the presence of UV light give cyclopropane and its derivatives. This addition

takes place across the double bond

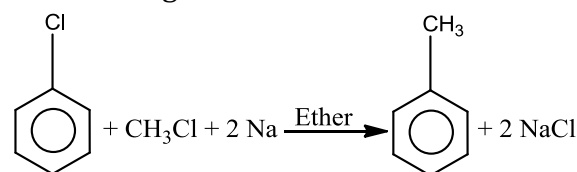


- 75 **(c)**
 Fluorination is highly explosive and occurs violently.
- 76 **(b)**
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$; $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHClCH}_3$;
 $\text{CH}_3\text{CH}_2\text{CHClCH}_2\text{CH}_3$
- 77 **(d)**



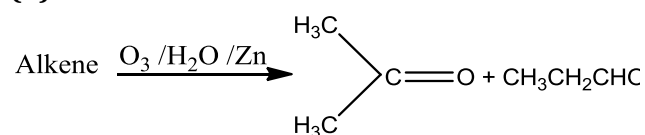
The addition takes place according to Markownikoff's rule.

- 78 **(c)**
 $\text{C} + \text{H}_2 \xrightarrow{\text{Arc}} \text{C}_2\text{H}_2$
- 79 **(d)**
 Wurtz-Fittig reaction

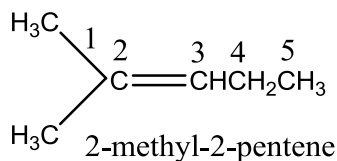
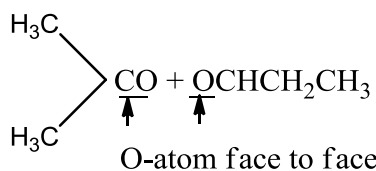


The reaction is used to yield aromatic hydrocarbons.

- 81 **(d)**
 Alkanes are non-polar and have almost non-polar bonds $\text{C}-\text{H}$ and non-polar bond $\text{C}-\text{C}$. They show only substitution reactions in presence of light.
- 82 **(d)**

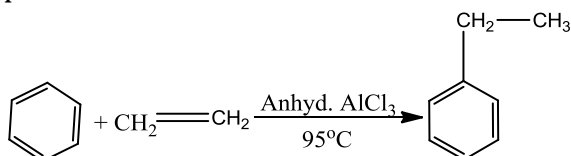


To identify alkene (from ozonolysis products) place these products with O-atoms face to face. Replace O-atoms by = (double bond).



83 (c)

By the reaction of benzene with ethylene in presence of anhydrous AlCl_3 , ethylbenzene is produced.



84 (b)

Double bond is broken to give ketone and acid.

85 (a)

Toluene has electron releasing group (CH_3) thus it is most reactive towards electrophilic nitration

86 (c)

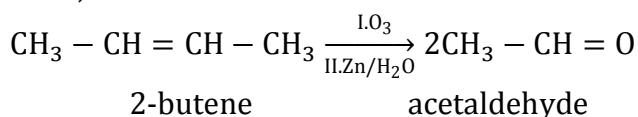
$$C_nH_{2n}O = 44$$

$$C_nH_{2n} = 44 - 16 = 28$$

$$\therefore n = 2$$

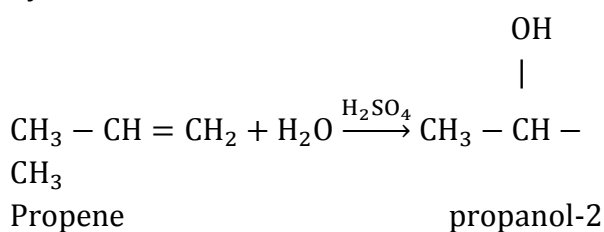
So, $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$ is a symmetrical alkene.

Thus,



87 (b)

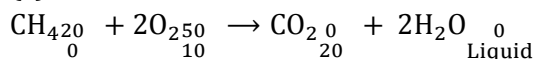
Conversion of propene to propanol is hydration.



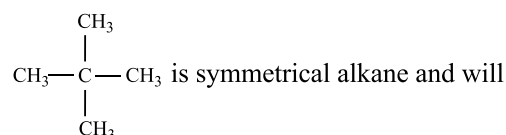
88 (c)

The process is called aromatization.

89 (c)



90 (c)



give only one monosubstituted product.

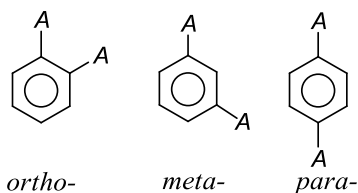
Is a symmetrical alkane and will give only one monosubstituted product.

$$\text{Also } C_nH_{2n+2}, \text{ i.e., } 12n + 2n + 2 = 72$$

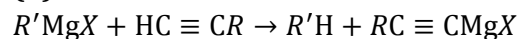
$$\therefore n = 5$$

91 (b)

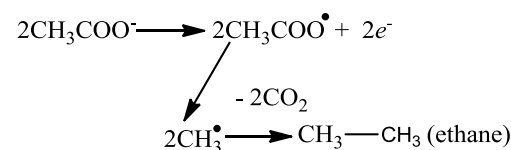
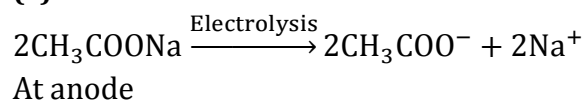
The number of disubstituted products of benzene is three



92 (b)



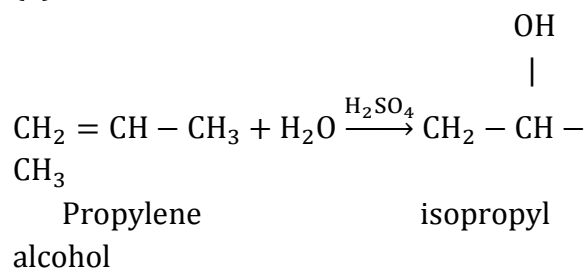
93 (a)



95 (c)

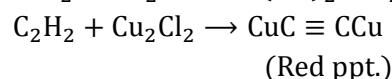
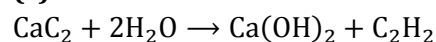
Reactivity towards electrophilic substitution increases as the electron density in the benzene ring increases. Since CH_3 is a strong electron donating group, it can be most readily sulphonated.

96 (b)



Thus, in this reaction isopropyl alcohol is formed.

98 (c)



100 (a)

According to Huckel's rule, an aromatic compound should have $(4n + 2)\pi$ -electrons. Where, n is an integer, i.e., 0, 1, 3, 4, ... and

possesses unusual stability due to the delocalisation of π -electrons.

102 (d)

The octane no. for *n*-heptane is zero.

103 (c)

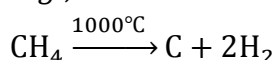
This is hydrogenation of alkane.

104 (a)

Tar, *i. e.*, pitch contains alkanes from C_{30} to C_{40} chain.

105 (a)

Thermal decomposition of alkanes in the absence of air is called cracking or pyrolysis *e. g.*,



106 (c)

The following are the necessary conditions for compound to be aromatic.

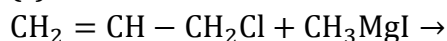
1. Molecule must be planar and cyclic.
2. Conjugated double bond must be present.
3. It must have $(4n + 2)\pi$ -electrons.

107 (d)

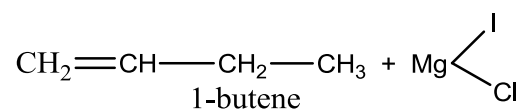
$CH_2 = CH - CH = CH_2$; $sp^2 - sp^2$ (C — C) bond length is 1.34 Å



108 (c)



allyl chloride



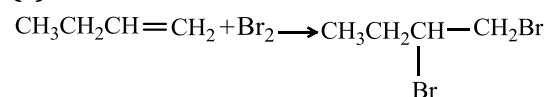
109 (c)

(i) Among alkanes boiling point increases with increase in molecular mass.

(ii) Among isomeric alkanes the boiling point decreases with branching due to decrease in surface area.

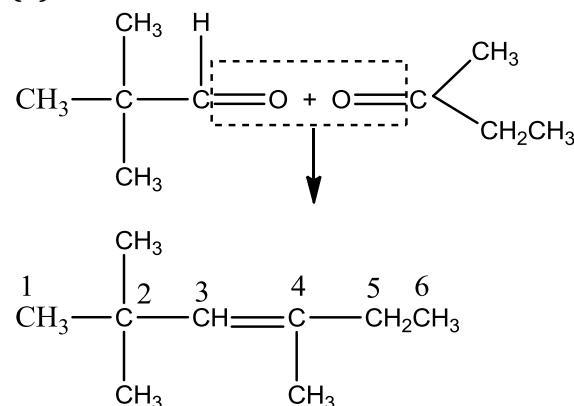
n-octane will have highest boiling point because it has highest number of carbon atoms and does not show branching.

110 (c)



(addition reaction).

111 (d)



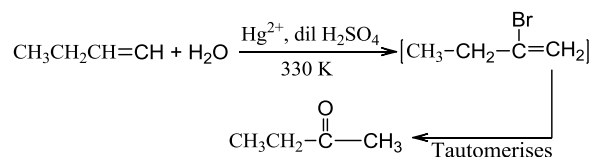
2, 2, 4 trimethyl-3-hexene

To

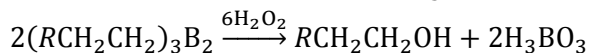
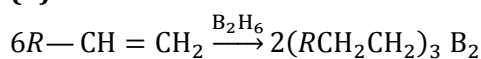
determine alkene, place these products with O-atoms face to face and replace O-atoms by =bond.

114 (a)

The presence of $dilH_2SO_4$ and mercury salts, alkynes add a molecule of H_2O to form aldehydes or ketones



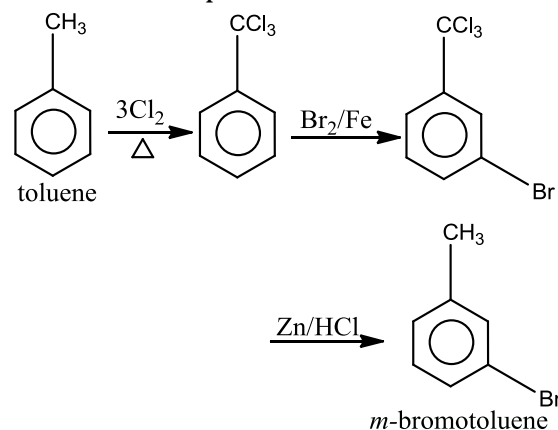
115 (b)



This process always gives alkanol-1 from alkane-1.

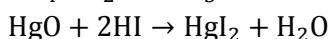
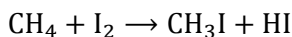
117 (b)

Side chain hydrogen atoms are substituted in presence of light or heat. Ring hydrogens are substituted in presence of Lewis acid.

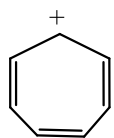


118 (b)

Direct iodination of alkane is not possible because of reversible nature of HI. It is therefore carried out in presence of HgO or HIO_3 .



119 (b)



is aromatic

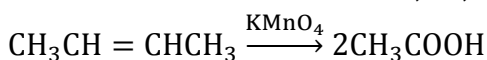
is aromatic.

It contains 3 double bonds (6π electrons).

According to Huckel rule $(4n + 2)\pi = 6\pi$ electrons where, $n = 1$

120 (b)

Since, the alkene of oxidation gives only acetic acid, therefore, the alkene must be symmetrical containing two carbon-atoms on either side of the double bond, *ie.*, 2-butene.



122 (d)

When carbon is bonded to four other atoms, the angle between any pair of bonds = $109^\circ, 28'$ (tetrahedral angle) but the ring of cyclobutane is square with four angles of 90° . So, deviation of the bond angle (angle strain) in cyclobutane

$$= 109^\circ 28' - 90^\circ / 2$$

$$= 19^\circ 28' / 2$$

$$= 9^\circ 44'$$

123 (c)

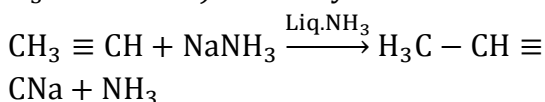
Excess of Cl_2 finally converts all products to CCl_4 .

124 (a)

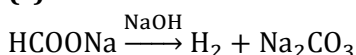
n-heptane gives toluene; *n*-octane gives ethyl benzene.

125 (a)

The H-atoms of terminal alkyne (*ie.*, $\text{H}_3\text{C}-\text{C}\equiv\text{CH}$) is weakly acidic.

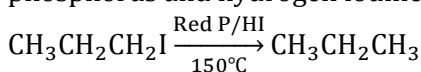


126 (c)



127 (c)

Alkyl halides undergo reduction with red phosphorus and hydrogen iodine



128 (a)

CH_4 diffuses rapidly because of low mol. wt.

129 (a)

Boiling point \propto molecular mass $\propto \frac{1}{\text{branching}}$

(\therefore surface area decreases)

\therefore *n*-hexane has the highest boiling point among the given.

130 (d)

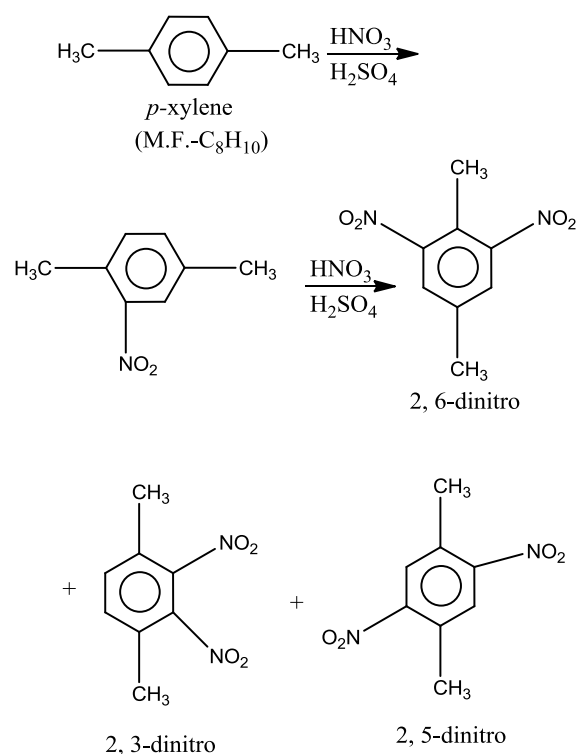
In this conformer Cl is at equatorial position and is least hindered.

131 (c)

Rest all are industrial uses of C_2H_2 .

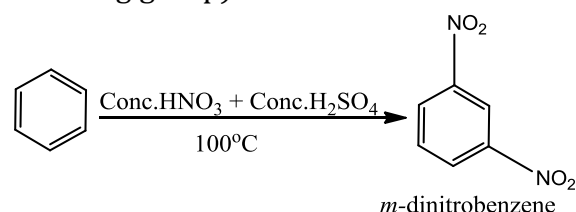
132 (d)

In *p*-xylene, the four nuclear H-atoms are equivalent and hence, only one mononitro derivative is formed. But it gives three dinitro derivatives (2,3;2,6 and 2,5) as shown below



134 (b)

At 60° (low temperature) mononitration occurs and nitrobenzene is obtained but at 100°C , nitrobenzene further undergoes electrophilic substitution and gives *m*-dinitrobenzene (as $-\text{NO}_2$ is a *meta* - directing group).



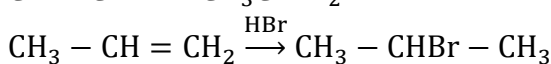
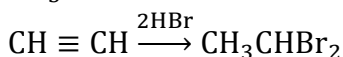
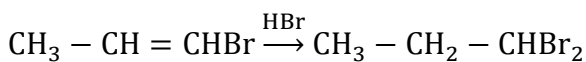
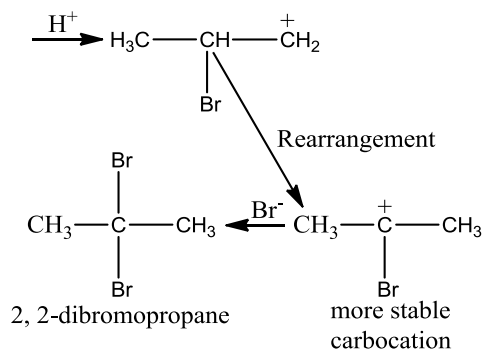
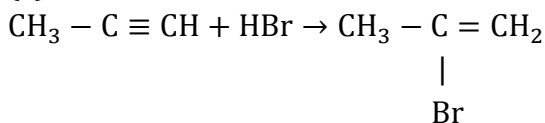
135 (b)

Rest all are aromatic compounds.

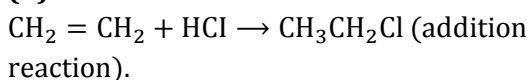
136 (b)

General formula of alkane is C_nH_{2n+2} ; $2n + 2 = 10$.

137 (a)



138 (b)



140 (d)

Primary alcohols are oxidized to aldehydes and then to acid to decolourise $KMnO_4$. Also ethylene oxidizes to formic acid.

141 (b)

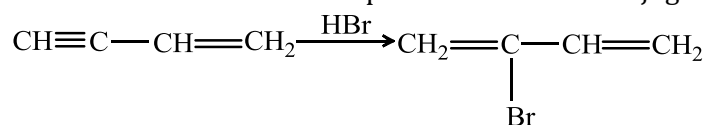
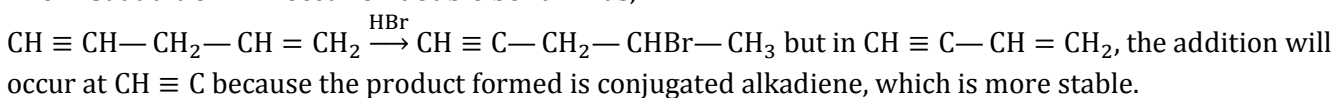
Propyne gives white ppt. with ammoniacal $AgNO_3$.

144 (a)

Homologues of benzene may be prepared by warming an ethereal solution of an alkyl or aryl halide with sodium

150 (a)

The first addition will occur on double bond. Thus,



151 (b)

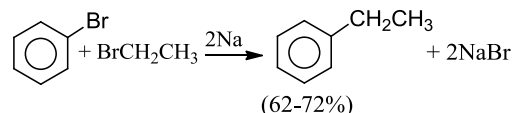
It is alicyclic or aliphatic unsaturated.

152 (a)

$(C_2H_5)_4Pb$ on addition to gasoline increases its octane no. by about 5 units.

153 (b)

On heating with sodamide ($NaNH_2$ in liq. NH_3), alkynide is formed

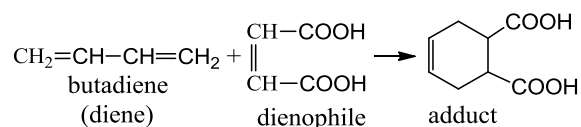


145 (d)

These are characteristics of ozonolysis.

146 (a)

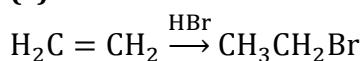
When a conjugated diene (diene) is heated with an unsaturated compound (dienophile) in a sealed tube, an addition product (adduct) is obtained. This reaction is called Diel's Alder reaction



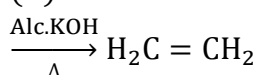
148 (b)

Unsymmetric alkene and HBr are primary conditions for Kharasch effect.

149 (a)

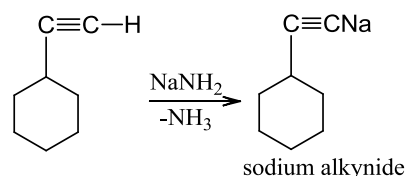


(A)



(A)

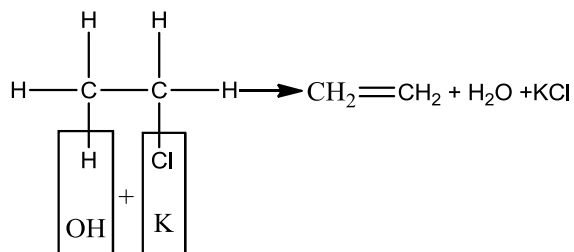
Hence, $A = C_2H_4$; $B = alc. KOH/\Delta$



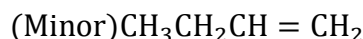
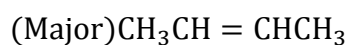
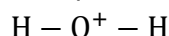
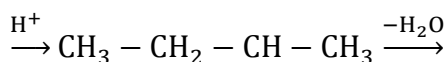
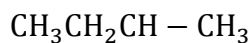
154 (c)

Only alcoholic KOH gives dehydrohalogenation reaction. Ethyl chloride

reacts with alcoholic KOH as



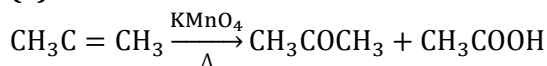
156 (d)



157 (d)

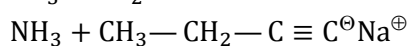
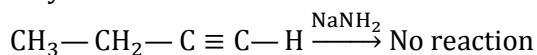
It is fact. Follow octane number.

158 (a)



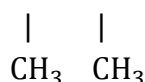
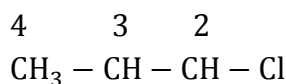
159 (a)

1-Butyne reacts with NaNH_2 to give sodium salt while 2-butyne does not react. Only terminal alkynes are acidic.

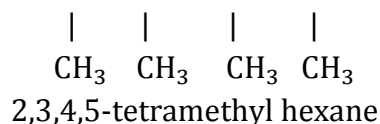
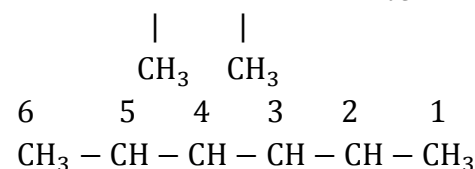
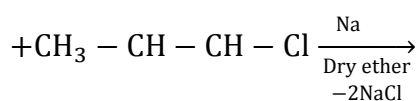


160 (c)

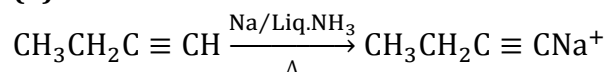
When an alkyl halide reacts with sodium in presence of dry ether, an alkane with the double number of carbon atoms than the parent halide, is obtained and this reaction is known as Wurtz reaction.



2-chloro-3-methyl butane



161 (b)



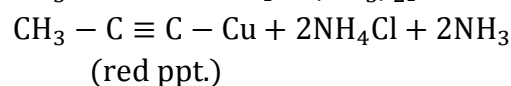
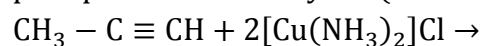
Considering the options given it appears correct. Na/liq. NH_3 is known for metal dissolved reduction. Actually it is truth that Na/liq. NH_3 reduces internal triple bond and terminal double bond and do not reduce the terminal alkyne due to such alkylide formation.

162 (a)

Homologous may or may not be straight chain compounds.

163 (c)

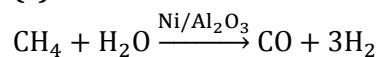
Ammoniacal cuprous chloride will give red precipitate with 1-alkynes (terminal alkynes).



165 (c)

C—C bond involves $2sp^3-2sp^3(\sigma)$ whereas, C—H bond involves $2sp^3-1s(\sigma)$ in alkanes.

166 (c)

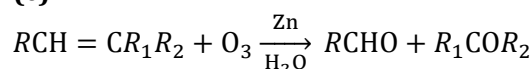


167 (c)

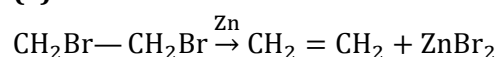
Terminal alkyne reacts with ammoniacal AgNO_3 solution give a white ppt, therefore x must be a terminal alkyne. Thus, x must be $(\text{CH}_3)_2\text{CHC}\equiv\text{CH}$

$$(\text{CH}_3)_2\text{CHC}\equiv\text{CH} \xrightarrow{\text{KMnO}_4} (\text{CH}_3)_2\text{CHCOOH} + [\text{HCOOH}]$$

168 (c)

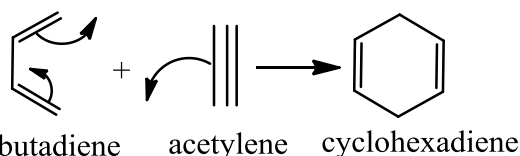


170 (a)



171 (d)

An alkyne combine with a conjugated diene to give an unconjugated cycloalkadiene. This reaction is known as **Diels-Alder reaction**.



172 (a)

Now-a-days used in refineries.

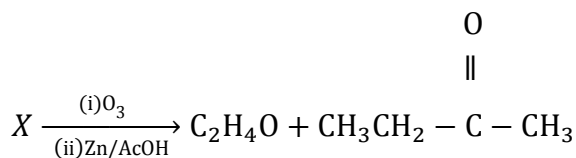
173 (b)

Kerosene contains alkanes from C_{12} to C_{16} .

174 (d)

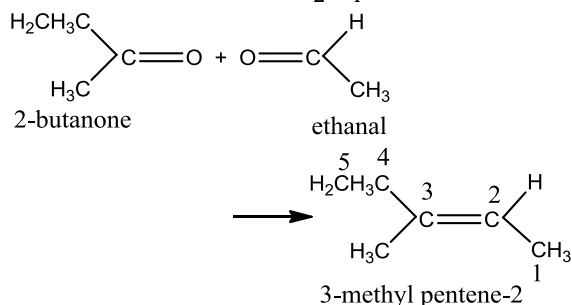
On treatment with alcoholic KOH, 1-chlorobutane gives 1-butene while 2-chlorobutane gives 2-butene (major) + 1-butene (minor). Therefore, a mixture of 1-butene + 2-butene is formed.

176 (a)



Aldehyde 2-butanone

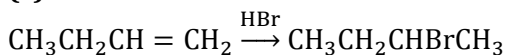
The aldehyde should be CH_3CHO because the molecular formula is C_2H_4O .



177 (b)

Octane no. for iso-octane has been arbitrarily assumed to be 100 and for *n*-heptane as zero.

178 (c)



179 (d)

In cyclopropane the angle strain is maximum. Hence, it is highly strained molecule and consequently most unstable. The angle strain in cyclobutane is less than cyclopropane. Hence, cyclobutane is more stable. This stability increases up to 6 membered rings then decreases from 7 to 11 membered rings and from the 12 membered rings onwards attains the stability of 6 membered ring. Heat of combustion is a method of measuring chemical stability. Hence, cyclohexane has the lowest heat of combustion.

180 (d)

At 70–120°C gasoline, at 150–250°C kerosene; at 250–400°C diesel oil.

190 (b)

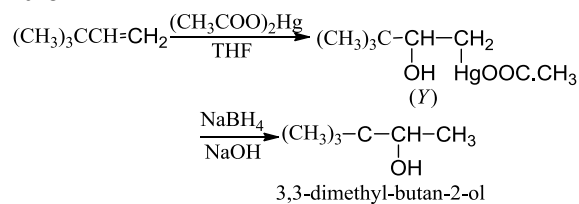
Mustard gas is β, β -dichlorodethylsulphide which is prepared by the action of sulphur monochloride on ethylene.

181 (b)

Triple bond is shifted from centre to corner.

183 (b)

Oxymercuration-demercuration is an example of hydration of alkene according to Markownikoff's rule

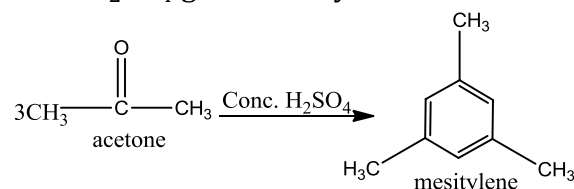


184 (b)

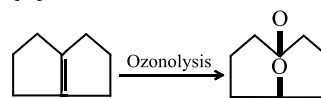
Cetane number of hexadecane is 100 and of methyl naphthalene is zero.

185 (c)

Distillation of acetone with concentrated conc. H_2SO_4 gives mesitylene.



186 (b)



See rupture of $C=C$ to convert it to $C=O$.

187 (b)

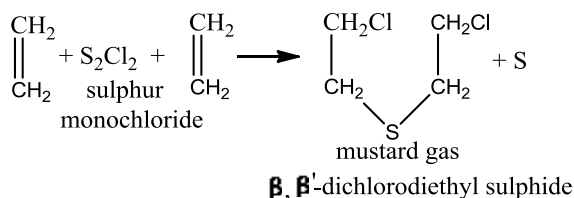
Soda lime ($NaOH + CaO$) is used to slow down the decarboxylation otherwise the reaction will occur violently.

188 (b)

More is the amount of CO in exhaust fuel, more incomplete is combustion of fuel.

189 (d)

It may be $CH_3CH_2C \equiv CH$ or $CH_2 = CH-CH = CH_2$ or $CH_3HC = CH-CH_3$.



191 (b)

$\text{CH} \equiv \text{CH} + \text{CH}_3\text{OH} \xrightarrow{\text{CH}_3\text{ONa}} \text{CH}_2 = \text{CH} \cdot \text{OCH}_3$ is nucleophilic addition.

192 (a)

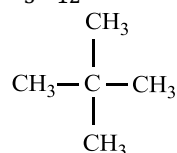
CH_4 obtained in (c) is contaminated with C_2H_2 , C_2H_4 and H_2 .

193 (b)

Larger is surface area, more is viscosity. Surface area decreases with increase in branching.

196 (a)

C_5H_{12} has molecular mass = 72



will give only one mono substituted product.

197 (a)

(i) Electron rich groups are *o, p* directing, $-\text{OH}$, $-\text{Br}$, $-\text{CH}_3$ etc.

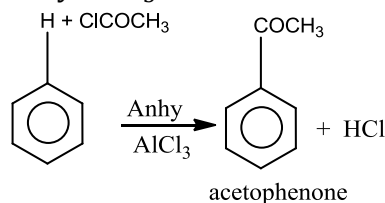
(ii) Electron deficient groups having multiple bonds are *m*-directing.

eg., $-\text{COOH}$, $-\text{NO}_2$

198 (c)

In the given compounds only acetophenone is prepared by substitution. Other compounds are prepared by addition reactions.

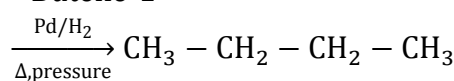
Acetophenone is prepared when benzene reacts with acetyl chloride in presence of anhy. AlCl_3 as



200 (d)

$\text{CH}_2 = \text{CH} - \text{CH}_2\text{CH}_3$

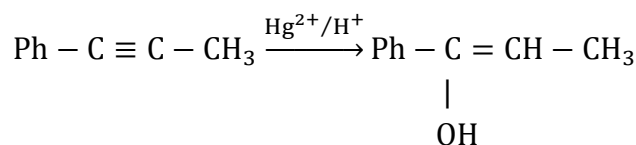
Butene-1



butane

Other reagents are successful with polar double bonds.

203 (a)



$\text{Ph} - \text{C} = \text{CH}_2\text{CH}_3$

||

O

(A)

204 (b)

Follow mechanism of Wurtz reaction.

205 (c)

It is a non-terminal alkyne.

207 (b)

1, 2-bromo cyclopentane on heating with 1^- in acetone gives cyclopentene.

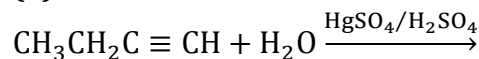
208 (b)

Terminal alkynes react with am. AgNO_3 or $\text{Ag}(\text{NH}_3)_2^+\text{OH}^-$ to give white ppt.

209 (a)

The reactivity order of 1° , 2° and 3° H-atoms has been explained in terms of hyper conjugation.

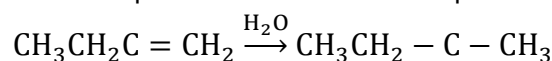
210 (d)



1-butyne

OH

|

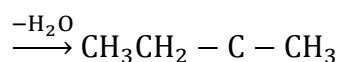


OH

|

OH

unstable



||

O

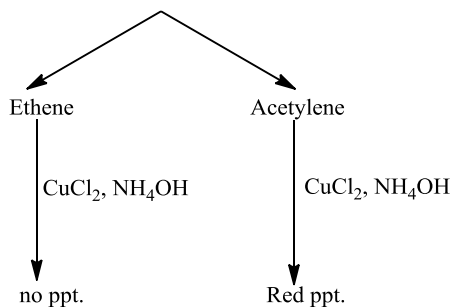
butan-2-one

212 (a)

The reactivity order is, $\text{Cl}_2 > \text{Br}_2 > \text{I}_2$.

213 (c)

Decolourisation of KMnO_4 (unsaturation test)

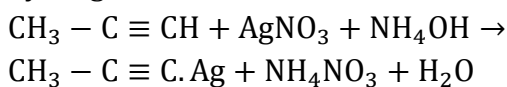


214 (b)

Indane is commercial name of L.P.G.

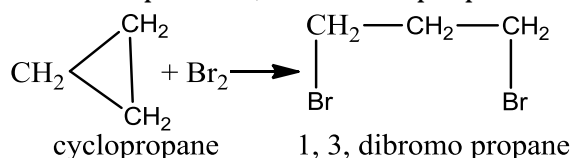
215 (a)

Terminal alkynes react with ammoniacal AgNO_3 to give silver salt as they have acidic hydrogen.



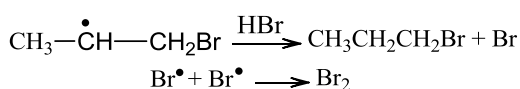
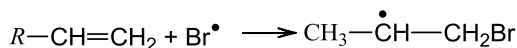
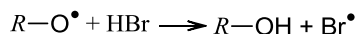
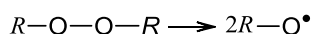
217 (a)

Cyclo propane is the most unstable cyclic compound. So, with bromine it gives an open chain compound 1, 3-dibromopropane.



218 (c)

Addition of HBr to an alkene in the presence of peroxide is the example of free radical addition reaction



219 (a)

All H-atoms in *neo*-pentane are equivalent thus, it will yield monochloro product

220 (b)

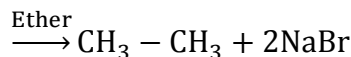
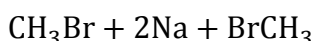
Acetylenichydrogens are acidic because sigma electron density of C – H bond in acetylene is nearer to carbon, which has 50% *s*-character

221 (c)

Follow text.

222 (c)

Wurtz reaction Alkyl halide reacts with sodium in presence of dry ether forms alkane is known as Wurtz reaction.



223 (b)

It is an experimental fact.

224 (c)

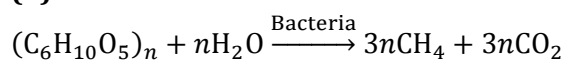
(i) Unsaturated hydrocarbons are more reactive than saturated hydrocarbons.
(ii) Among alkene and alkyne, alkene are more reactive because $\text{C} \equiv \text{C}$ is quite strong bond.

\therefore Correct order of reactivity

Alkene > alkyne > alkane

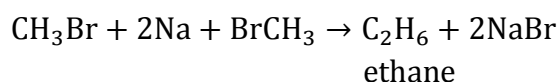
or $\text{C}_2\text{H}_4 > \text{C}_2\text{H}_2 > \text{C}_2\text{H}_6$
ethene ethyne ethane

225 (b)



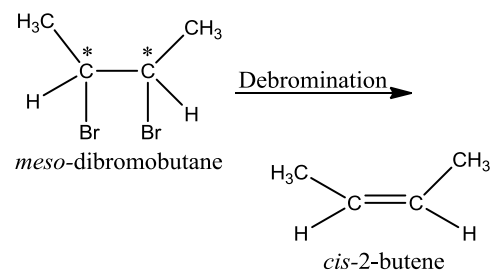
226 (c)

It is a common method to prepare alkanes. Methane cannot be prepared by Wurtz reaction.



227 (b)

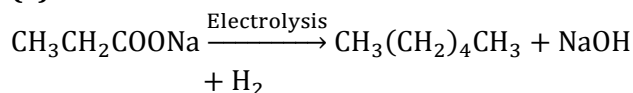
Symmetrical optical isomers are called mesomers.



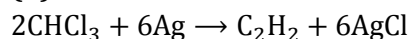
228 (b)



229 (a)



230 (b)

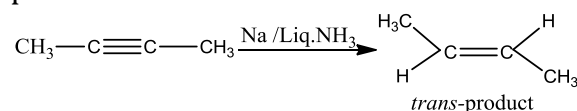


231 (d)

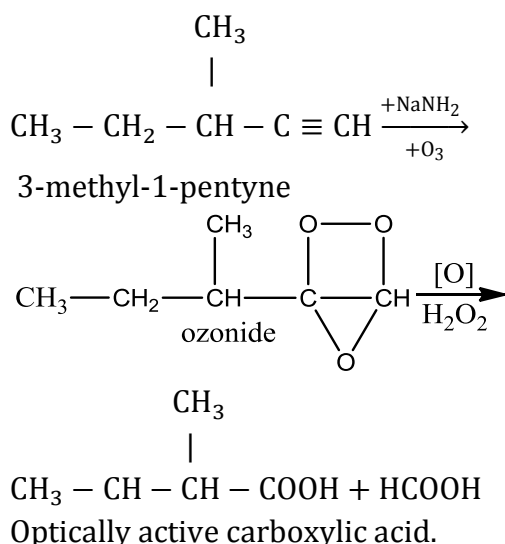
In the presence of ferric chloride, electrophilic substitution at *ortho* and *para* position take place

232 (b)

Butyne reacts with Na/liq. NH_3 to give *trans*-product.

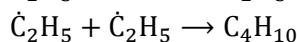
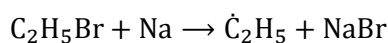


233 (c)

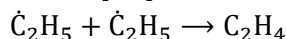


236 (a)

The mechanism of Wurtz reaction is:

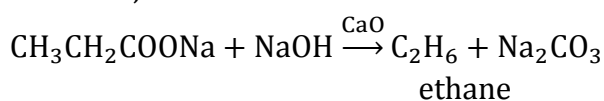


The disproportionation of free radical gives

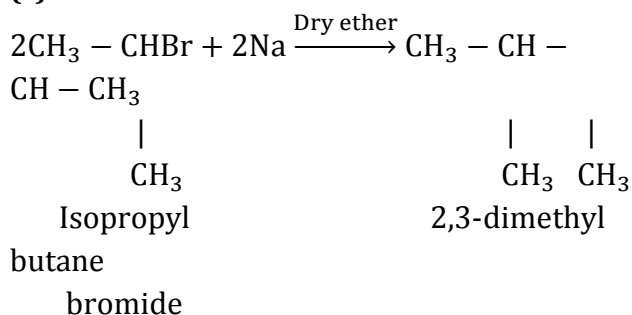


237 (b)

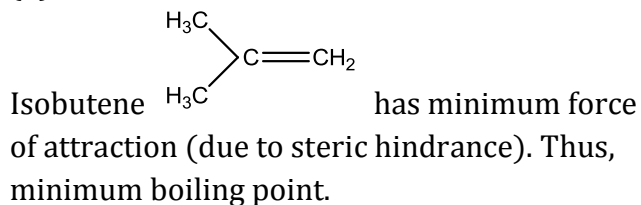
When sodium propionate is heated with sodalime, ethane is formed.



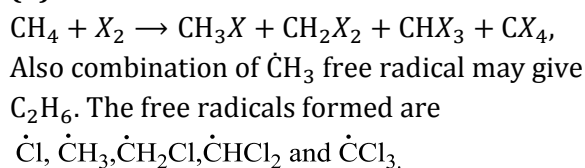
238 (c)



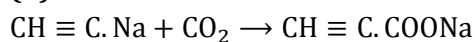
239 (d)



240 (d)



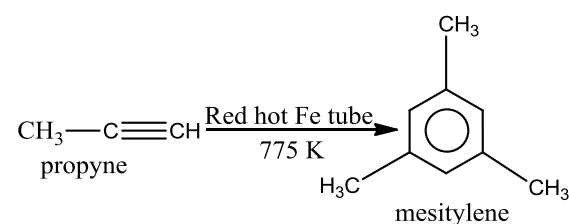
242 (b)



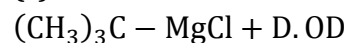
243 (a)

Propyne on passing through red hot iron tube

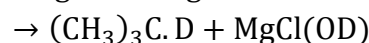
gives mesitylene



244 (c)



Grignard reagent



[Grignard reagent when reacts with a protic solvent, gives alkane].

245 (a)

These are arbitrarily assigned values.

246 (d)

Acetylene does not react with NaOH.

247 (d)

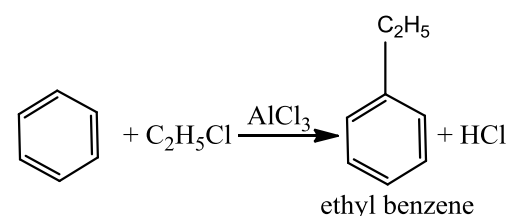
82 g CH_3COONa gives 22.4 litre CH_4 .

248 (d)

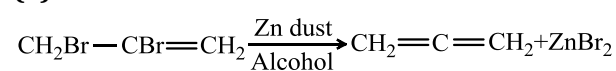
Non-terminal alkynes do not have acidic H-atom.

249 (a)

In presence of a Lewis acid (like AlCl_3), benzene gives electrophilic substitution reaction with alkyl halide. This is called Friedel-Craft's alkylation.



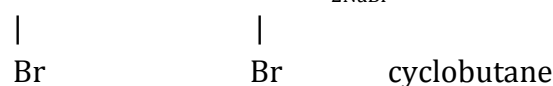
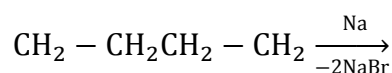
250 (a)



This is dehalogenation.

251 (d)

ω -dihalides when reacts with sodium metal, gives cyclic hydrocarbons. This is an example of intramolecular Wurtz reaction.



252 (d)

Rest all are detained by it.

255 (a)

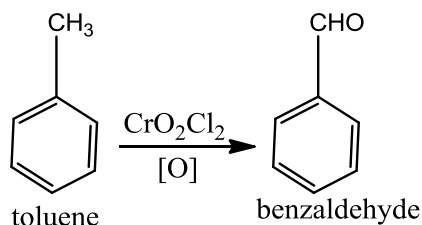
Due to more close packing, even carbon atom alkanes have higher value.

258 (b)

Product will be spiropentane.

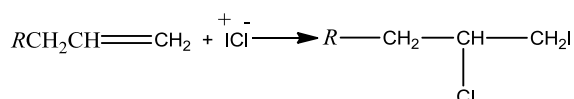
260 (a)

Toluene is oxidised to benzaldehyde in presence of chromyl chloride. This reaction is called Etard's reaction.



262 (a)

Markownikoff's addition the negative part of the unsymmetrical reagents adds to a less hydrogenated (more substituted) carbon atom of the double bond. In ICl, Cl is more electronegative. So, it will take negative charge, .e., I^+Cl^- . So, the product is



263 (b)

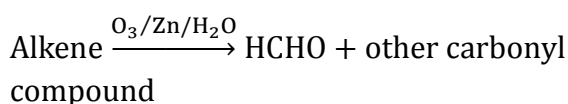
Reduction of CH_3COCH_3 with HI and red P will give propane

264 (a)

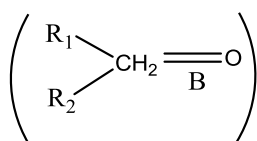
Acetylene is acidic and thus reacts with $NaNH_2$. Na. Amm. $AgNO_3$ reduces itself on reacting with acetylene with HCl it gives addition reactions. However, being weak it does not react with NaOH.

265 (b)

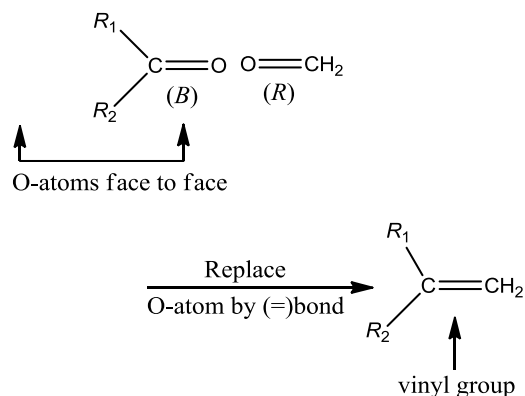
Alkenes give carbonyl compounds on ozonolysis



(A)



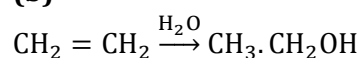
To determine alkene, place carbonyl compounds with their O-atom face to face. Replace O-atom by a double bond



266 (c)

An increase in molecular weight results in an increase in van der Waals' forces of attractions which results in an increase in b.p.

268 (b)



269 (b)

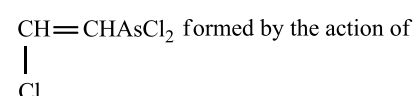
LPG is a mixture of lower alkanes mainly isobutene and butane.

271 (d)

Reducing agent P + HI gives alkane in every case.

272 (b)

Lewisite is



$AsCl_3$ on $CH \equiv CH$

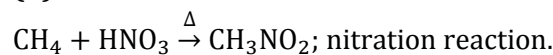
275 (b)

Follow Saytzeff's rule for elimination.

276 (c)

Any aliphatic carbon with hydrogen attached to it, in combination with benzene ring, will be oxidised to benzoic acid by $KMnO_4/H^+$.

277 (d)



278 (d)

Terminal alkynes give red. Ppt. with amm. Cu_2Cl_2 .

279 (a)

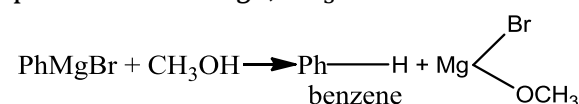
An isolated alkadiene has double bonds, one at each corner.

281 (b)

Na will react with $-OH$ group

283 (b)

$PhMgBr$ can be protonated by any of the protic solvent .e.g., CH_3OH .



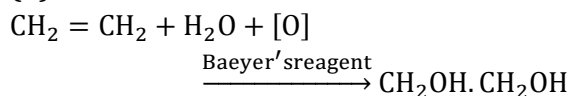
284 (d)

Addition of iso-octane to gasoline increases octane number of fuel or decreases knocking.

285 (d)

Because of less density cyclo hexane floats over water.

286 (d)



287 (b)

The reduction of $>\text{C}=\text{C}<$ only to $>\text{CH}-\text{CH}<$ is influenced by $\text{H}_2/\text{catalyst}$.

289 (a)

Except NaOH rest all reacts with C_2H_2 .

290 (b)

Catalytic hydrogenation is free radical addition. Also more is heat of hydrogenation ($\Delta H = -ve$) more is reactivity for alkene for hydrogenation.

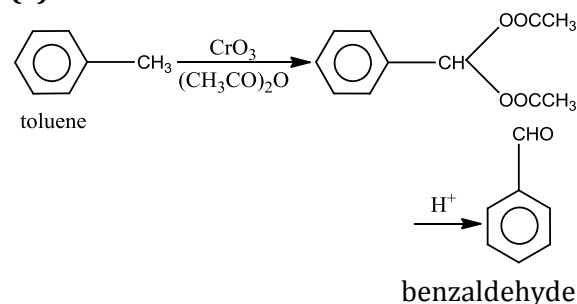
291 (d)

It is simply called addition of halogen.

292 (c)

$\text{CO} + 3\text{H}_2$, is called synthetic gas.

293 (a)

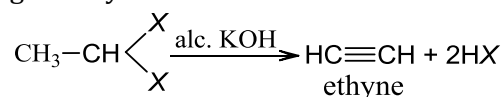


294 (c)

Alkaline KMnO_4 converts an H-atom to $-\text{OH}$ gp.

295 (a)

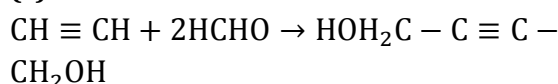
Gem dihalides on treatment with alcoholic KOH give alkyne.



296 (c)

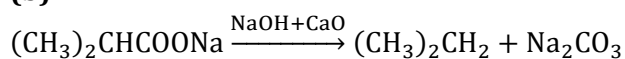
Ag^+ ion increases the solubility of alkenes due to the formation of $p\pi - d\pi$ bonding.

297 (c)



Acetylene 2, butyne-1, 4-diol

298 (b)



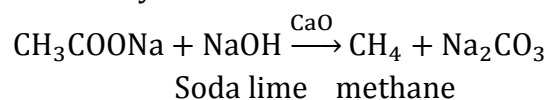
299 (a)

Alkenes show electrophilic addition.

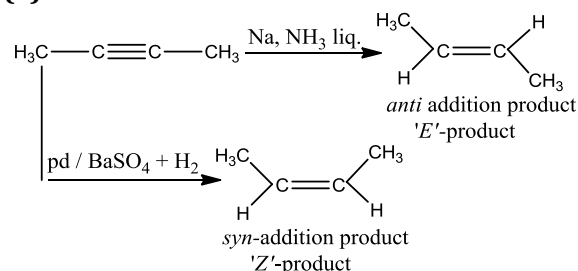
301 (c)

Methane cannot be produced by Wurtz reaction, Kolbe's electrolytic method and reduction with H_2 because, it has one carbon atom.

Pure methane can be produced by the decarboxylation of sodium acetate.



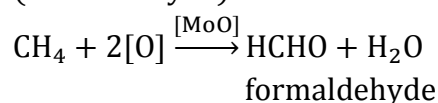
302 (a)



Hence, reagent X and Y are respectively Na, NH_3 and $\text{Pd}/\text{BaSO}_4 + \text{H}_2$.

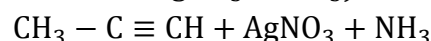
303 (d)

When methane is oxidised in presence of molybdenum oxide (MoO), it gives methanal (formaldehyde).



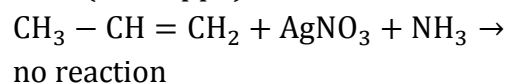
304 (d)

Propyne reacts with AgNO_3 in NH_3 to give while ppt. of silver acetylide and propene does not react with it. (Only terminal alkynes react with AgNO_3 in NH_3).



Propyne

$\rightarrow \text{CH}_3 - \text{C}\equiv\text{C Ag}$
silver acetylide
(white ppt.)



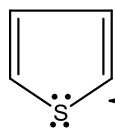
305 (a)

Rotation of groups or atoms round single bond produces conformation.

306 (a)

A compound is said to have aromatic character if ring system is planar (with p -orbital) and there is complete delocalisation of π -electrons (lone pair may be taken for delocalisation as relay electrons). This is true

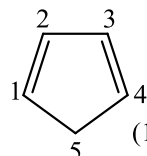
is conjugated cyclic system.



Huckel rule is followed by when electrons used in delocalisation = $(4\pi + 2)$

(including lone-pair)

Where, $n=0, 1, 2, 3, \dots$



(1, 3-cyclopentadiene)

4. ring is planar
5. ring is not conjugated
6. delocalisation of π -electrons is not possible after C_4 .
7. $(4\pi + 2)\pi$ -electrons = 4

Hence, it is not aromatic.

307 (b)

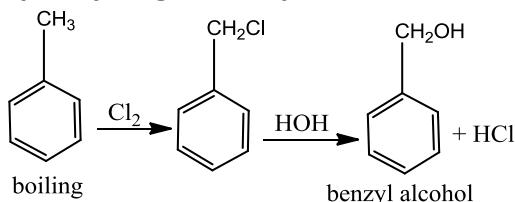
Kerosene contains $C_{11} - C_{16}$ atoms alkanes.

308 (a)

The stability of alkenes increases with increase in substitution of H attached on doubly bonded carbon by alkyl groups.

309 (d)

When chlorine is passed in boiling toluene, substitution in side-chain takes place and benzyl chloride is obtained which on hydrolysis give benzyl alcohol.



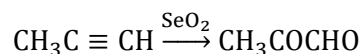
310 (b)

To oxidize HI formed during the reaction; otherwise the strong reducing nature of HI will reverse the iodination.

312 (c)

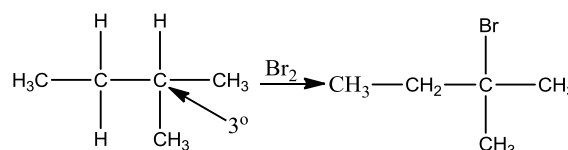
Reactivity of alkenes decreases with increase in no. of carbon atoms in alkene as well as substitution of H-atom attached to double bond.

313 (c)

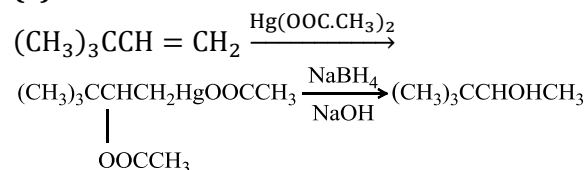


314 (c)

3° (C - H) bond has minimum bond energy hence easily cleaved giving 2-bromo-2-methylbutane



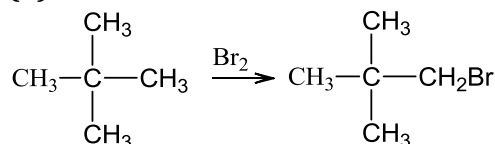
315 (a)



316 (d)

These are facts about alkanes.

318 (b)



Only primary hydrogen atoms are present here, thus only one product is formed

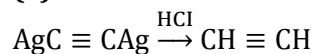
319 (d)

The phenomenon of decomposition of higher alkanes into lower hydrocarbons on heating in absence of air is called cracking.

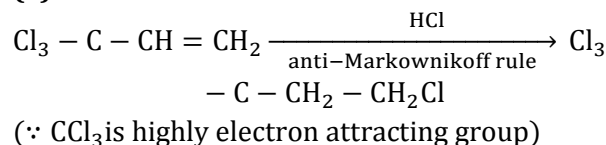
320 (a)

Ethyl benzene cannot be prepared by Wurtz reaction. This method is suitable for the preparation of symmetrical alkanes.

321 (a)



322 (a)



323 (b)

KOH alc., $NaNH_2$ and C_2H_5ONa are used for dehydrohalogenation.

324 (b)

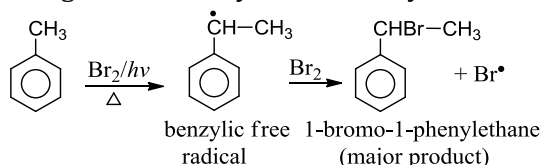
Octane number represents percentage of iso-octane.

325 (a)

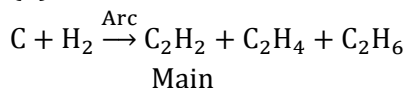
Cyclopropane is most strained alkane; follow Baeyer's strain theory.

326 (c)

If the side chain is larger than a methyl group, the halogenation always at the benzylic carbon



327 (d)



328 (b)

Propene undergoes allylic substitution at this temperature instead of addition reaction.

330 (d)

$\text{C}_2\text{H}_4(\text{OH})_2$ is anti-freeze; $\text{C}_2\text{H}_5\text{Cl}$ is solvent.
 $\text{C}_2\text{H}_4\text{O}$ is fumigant.

331 (a)

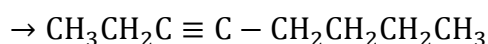
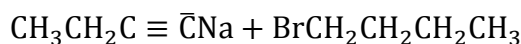
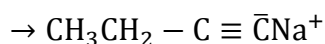
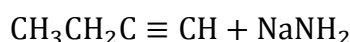
C_6H_6 is main product of light oil fraction.

333 (b)

C_2H_2 is commonly used in oxy-acetylene welding.

334 (d)

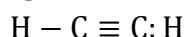
3-octyne is obtained by the reaction of 1-bromobutane and but-1-yne in presence of sodamide.



3-octyne

335 (b)

In C_2H_2 each C-atom is sp -hybridised which contains 50% s -character. The greater the s -character of an orbital, the bonding electron pair will be more inclined towards the nucleus as a result carbon would acquire a negative charge and hydrogen a positive charge. Hence, it is acidic in nature.



$sp \quad sp$

and removal of hydrogen as proton takes place.

336 (a)

Follow mechanism of addition reactions.

337 (d)

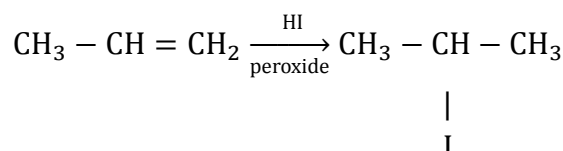
$\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$ (1,3-dibutene) is a

conjugate diene because it has alternate carbon-carbon single and double bonds. It reacts with HBr. It also polymerises to form Buna-N rubber etc.

It also polymerises to form SBR.

340 (b)

The product of given reaction will be according to Markownikoff's rule, this is because peroxide effect is applicable only in case of HBr and not effective in case of HI.

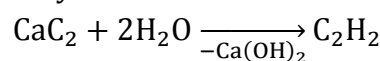


341 (b)

A characteristic reaction of aldehyde with Tollen's reagent. Rest all also attacks $\text{C}=\text{C}$.

342 (b)

When calcium carbide reacts with water, ethyne is formed.

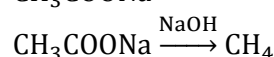
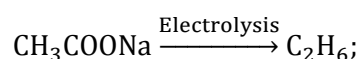
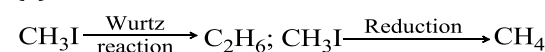


Calcium carbide ethyne



Formic Formic
acid acid

346 (c)

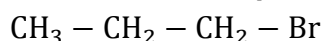
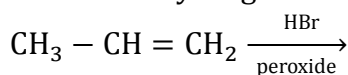


347 (a)

The addition of HBr to an alkene is an example of electrophilic addition reactions. It takes place by following mechanism.

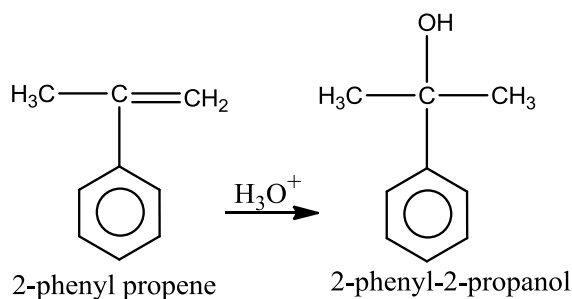
unsymmetrical reagent.

(ii) *Anti*-Markwonikoff's rule is applied to addition of HBr to unsymmetrical alkene in presence of peroxide. Free radical is the reaction intermediate during this reaction. According to this rule negative part of the reagent adds to carbon atom having more number of hydrogen atoms.



365 (a)

Acidic hydration of 2-phenyl propene follows electrophilic reaction mechanism forming an intermediate 3° carbocation (more stable), thereby forming 2-phenyl-2-propanol.



366 (a)

C_2H_4 is a monomer unit of polythene, *i. e.*, $\text{-(CH}_2 - \text{CH}_2\text{)}_n$

367 (c)

Halogenation of alkanes is free radical substitution.

368 (a)

Staggered form is more stable.

369 (b)

Alkene having all its H attached on double bond does not decolourise Br_2 water due to low reactivity.

370 (d)

R of RMgX reacts with acidic H to give alkane.

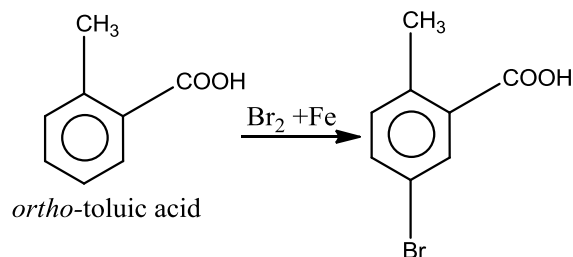
371 (a)

The carbon-carbon bond length in benzene (1.39 \AA) is between that of $\text{C} - \text{C}$ (1.54 \AA) and $\text{C} = \text{C}$ (1.34 \AA) *i. e.*, in between that of C_2H_6 and C_2H_4 .

373 (c)

Follow strainless ring theory.

374 (c)

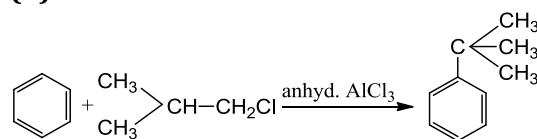


(\because In the product, $-\text{Br}$ is *para* to $-\text{CH}_3$ and *meta* to $-\text{COOH}$.)

375 (c)

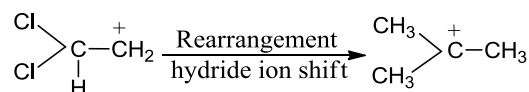
Hydrogenation of alkene or alkyne in presence of Ni is called Sabatier and Senderen's reaction.

376 (b)

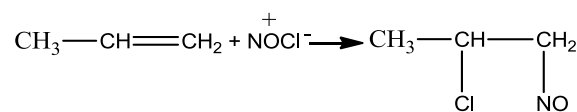


This reaction is an example of Friedel-Craft's reaction.

Mechanism:



377 (a)



This reaction is an example of electrophilic addition reaction and in it addition takes place according to Markownikoff's rule.

378 (c)

H_2SO_4 absorbs ethene.

379 (d)

These all are poisonous gases.

380 (d)

It is an anti-termite.

381 (b)

The boiling points of straight chain or *n*-alkanes increases regularly with increasing number of carbon atoms

382 (b)

$(\text{C}_2\text{H}_5)_4$ is anti-knock agent and increase octane no. of gasoline.

384 (b)

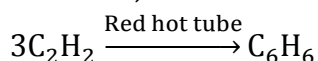
It is a fact.

385 (d)

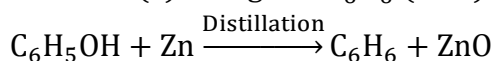
It is definition.

387 (a)

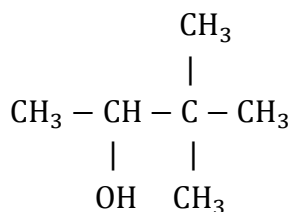
When acetylene is passed through red hot iron tube, benzene is formed as



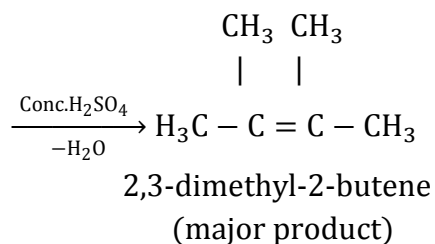
(X)

Reaction (a) also gives C_6H_6 (or X) as

389 (a)



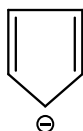
3,3-dimethyl butane-2-ol



390 (a)

Fractional distillation of petroleum gives a large number of products aliphatic and aromatic.

391 (a)



(Cyclopenta dienyl anion)

According to Huckel's rule

Total number of π -electrons inside the ring $(4n + 2)\pi$ electrons. $= (4 \times 1 + 2) = 6\pi$ electrons

So, it is aromatic.

392 (a)

Follow ozonolysis.

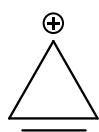
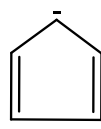
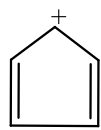
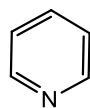
393 (c)

Natural gas is a mixture of 80% CH_4 and 10% C_2H_6 + 10% higher hydrocarbons.

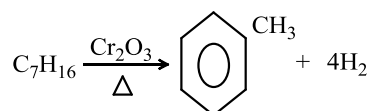
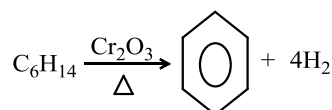
394 (b)

 $C_2H_5Br + 2Na + BrC_2H_5 \rightarrow C_2H_5C_2H_5$ or *n*-butane.

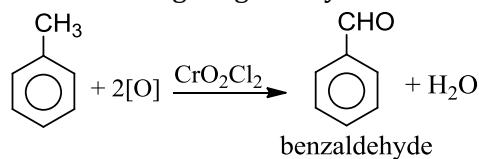
395 (c)

According to Huckel's rule an aromatic compound has $(4n + 2)\pi$ -electrons, where, $n = 0, 1, 2, 3, \dots$ etc. $; 4n + 2 = 2; n = 0; \text{aromatic}$  $; 4n + 2 = 6; n = 1; \text{aromatic}$  $; 4n + 2 = 4; n = 0.5; \text{non - aromatic}$  $; 4n + 2 = 6; n = 1; \text{aromatic}$

397 (a)

Alkanes with six to 10 carbons are converted to aromatic hydrocarbons, *e. g.*,

399 (b)

With acidic manganese dioxide or chromyl chloride, in CCl_4 solution, toluene and all other homologues of benzene are oxidized to terminal carbon atom giving aldehydes

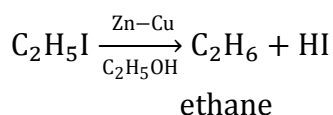
402 (d)

All are dehydrating agents.

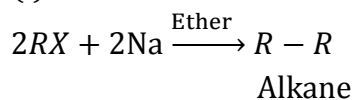
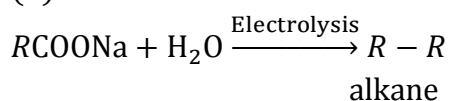
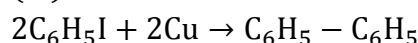
403 (a)

Terminal alkynes give white ppt. with am. $AgNO_3$

404 (a)

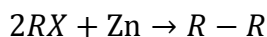
Alkyl halides can be reduced to hydrocarbons by means of $Zn - Cu$ couple in presence of alcohol.

405 (d)

(i) **Wurtz reaction**(ii) **Kolbe's reaction**(iii) **Ulmann's reaction**

biphenyl

(iv) Frankland reaction

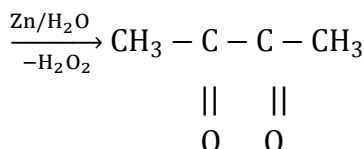
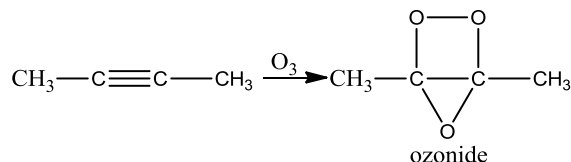


alkyl halide alkane

406 (c)

Both carbon have two sigma bonds on each.

407 (c)

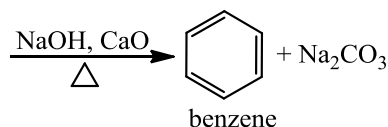
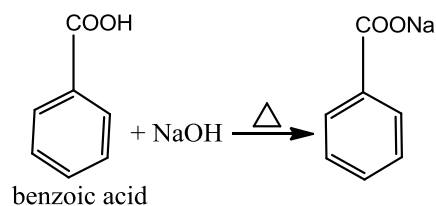


408 (d)

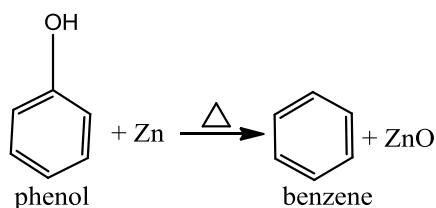
Note this temperature used in oxy-acetylene welding.

409 (b)

Benzene can be obtained by heating benzoic acid with sodalime.



Benzene can also be obtained by heating phenol with zinc dust.



410 (d)

Due to acidic hydrogen.

411 (b)

Fractional distillation of petroleum gives a large number of products aliphatic and aromatic.

413 (c)

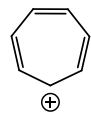
t. radicals are most readily formed.

414 (d)

According to the Huckel rule, a compound will be aromatic if compound should have $(4n + 2)\pi$ conjugated or delocalized electrons where n is a

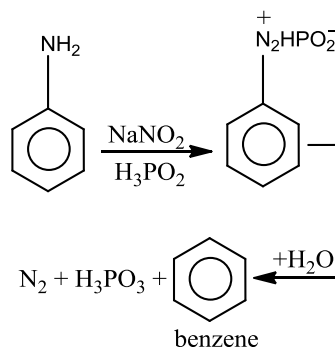
whole number and it may be

$n = 0, 1, 2, 3, 4, 5, 6, \dots$



6 π -conjugated electrons

415 (b)



In this reaction H_3PO_2 serves both as an acid as well as a reducing agent.

416 (c)

C_2Cl_6 is artificial camphor.

418 (d)

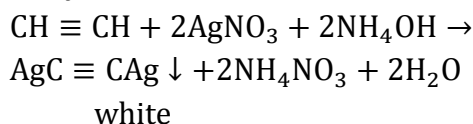
1, 3-butadiene is $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$; alternate single and double bonds.

419 (c)

Hexane and onwards alkanes are sulphonated. Isobutene is also sulphonated due to 3°H -atom.

422 (b)

Acetylene has some acidic character and its hydrogen gets replaced by silver to give silver acetylide.



423 (c)

Beryllium carbide gives CH_4 , magnesium carbide (MgC_2) and calcium carbide (CaC_2) give acetylene while silicon carbide being covalent does not undergo hydrolysis

424 (b)

The greater the branching, smaller is surface area, lesser is attraction among molecules and so low b.p.

425 (a)

Chair form is more stable.

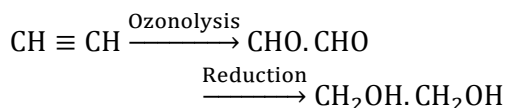
426 (d)

Both free radicals are used in terminating step.

427 (d)

It involves removal of a molecule from substrate.

428 (a)

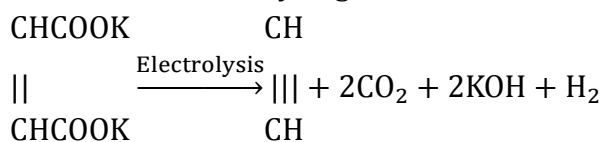


429 (a)

It is a test for unsaturation in molecule.

430 (c)

On electrolysis of potassium salt of fumaric and maleic acid, ethyne gas is obtained.



Potassium maleate ethyne

431 (a)

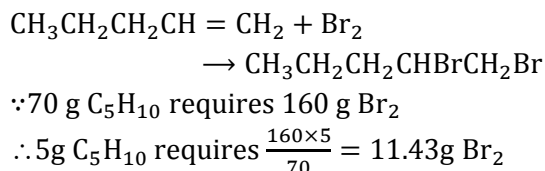
Column I	Column II
Benzene	$(4n + 2)\pi$ -electrons
Ethylene	Mustard gas
Acetaldehyde	Silver mirror
Chloroform	Phosgene

Benzene has 6π -electrons, *i. e.*, it follows Huckel rule $(4n + 2)\pi$ -electrons. Ethylene reacts with S_2Cl_2 to give mustard gas (war gas).

433 (b)

Follow peroxide effect.

434 (b)

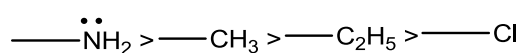


435 (c)

These are characteristics of C_2H_4 .

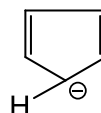
436 (a)

All those groups which contain at least one pair of non-bonding electrons on the atom adjacent to the benzene ring, are *ortho* and *para* directing. Among the given options, all are *ortho* and *para* directing but their capacity of *ortho* – *para* direction follows the order



Hence, $\text{—}\ddot{\text{N}}\text{H}_2$ is the strongest *ortho* – *para* directing groups.

437 (a)

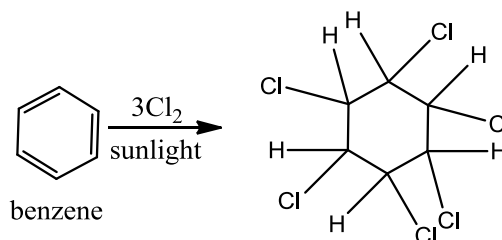


π electrons = $4 + 2 = 6$

As it obeys Huckel rule, it is aromatic

438 (c)

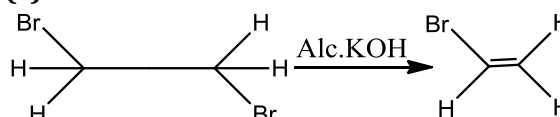
An insecticide, gammexane, is formed. It is also called benzene hexa chloride (BHC), though it is wrong. The correct chemical name is *syn*:hexachloro cyclohexane.



440 (d)

Alkane is $(\text{C}_2\text{H}_5)_4\text{C}$.

441 (c)



Vinylic bromide is more stable stronger base ($-\text{NH}_2^-$) is required for elimination.

443 (d)

An infinite conformers of ethane are possible including staggered, skew and eclipsed forms.

444 (c)

By adding bromine water to a solution, if the colour of bromine water decolourise then the compound is unsaturated. This is a confirmatory test for unsaturation.

445 (a)

Halogenation in alkane follow free radical mechanism. Formation of free radical occurs in presence of light.

448 (b)

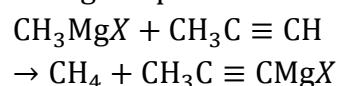
Removal of H_2O from a substrate by a dehydrating agent is called dehydration.

449 (b)

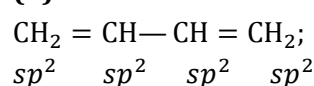
The catalyst used is called Ziegler's catalyst.

451 (d)

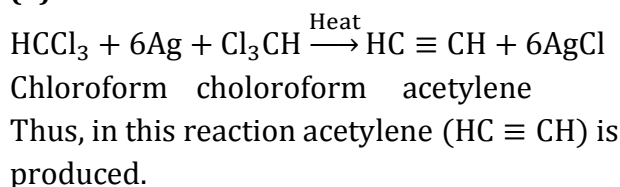
Terminal alkyne has acidic hydrogen which is enough to protonate the Grignard reagent.



452 (b)

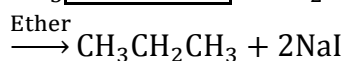
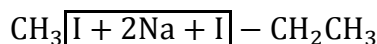


453 (d)

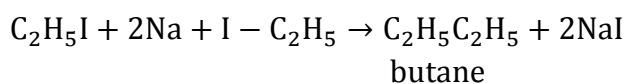
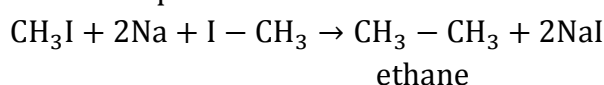


454 (d)

Methyl iodide and ethyl iodide, on treatment with sodium in ethereal solution, give a mixture of propane, ethane and butane, as follows



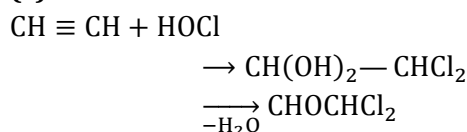
Propane



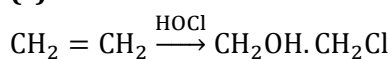
455 (b)

H is replaced by Cl.

456 (c)



457 (c)

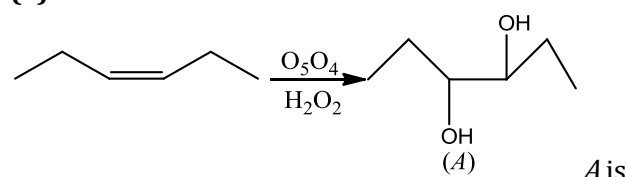


458 (d)

$$\text{Heat of hydrogenation} \propto \frac{1}{\text{stability}}$$

Among the given buta-1,3-diene is resonance stabilized, *ie*, more stable, thus it has lowest heat of hydrogenation

459 (a)



meso diol.

460 (b)

Both are unsaturated and give Baeyer's test.

461 (c)

Conjugated alkadiene have alternate single and double bond,

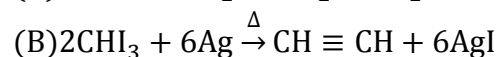
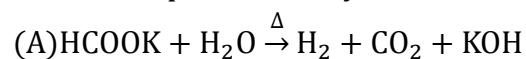
e. g., $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$.

463 (c)

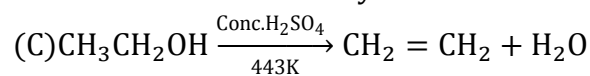
Natural gas is 80% CH_4 , coal gas contains 40% CH_4 ; Marsh gas is another name for CH_4 .

464 (b)

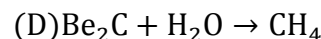
Iodoform and Ag undergo dehalogenation reaction to produce acetylene.



Iodoform silver acetylene



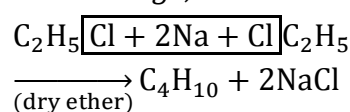
Ethylene



methane

465 (c)

In Wurtz reaction alkyl halide reacts with sodium in presence of dry ether to give alkanes *e. g.*,

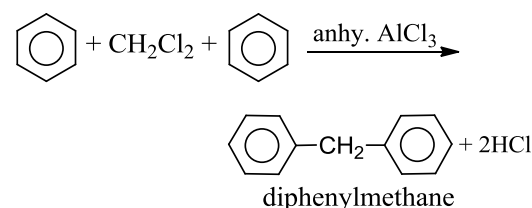


butane

In Wurtz reaction wet ether is not used because wet ether destroy the sodium metal.

466 (d)

When excess of benzene reacts with CH_2Cl_2 in presence of anhy. AlCl_3 , diphenylmethane is obtained



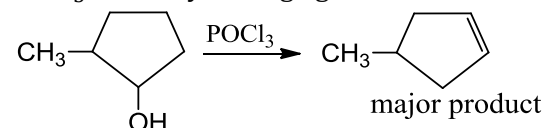
This reaction is an example of Friedel-Crafts' reaction

468 (c)

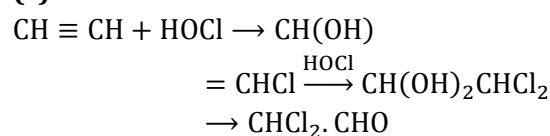
Gasoline among all has lowest b.pt.

469 (b)

POCl_3 is a dehydrating agent



470 (c)



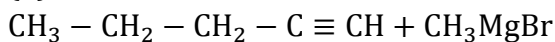
471 (b)

Reaction of 4-octyne and H_2 can be arrested at the alkene stage only by using palladium partially inactivated with trace of quinoline

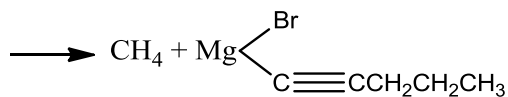
472 (c)

It is the name of reaction.

473 (d)



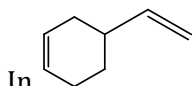
Methyl magnesium
bromide



Due to the presence of acidic hydrogen (hydrogen attached to triply bonded carbon atom) terminal alkyne (d) will react with methyl magnesium bromide.

474 (c)

Degree of unsaturation = $\frac{2n_1 + 2 - n_2}{2}$; where, n_1 is the number of carbon atoms and n_2 the number of hydrogen atoms.



In compound

Number of carbon atoms = 8

Number of hydrogen atoms = 12

Degree of unsaturation = $\frac{2 \times 8 + 2 - 12}{2} = 3$

477 (a)

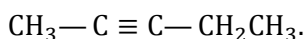
$\text{C}_2\text{H}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{C}_2\text{H}_5\text{HSO}_4$; addition of H_2SO_4 on ethane.

478 (b)

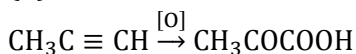
Peroxide effect is noticed only in case of HBr. For HCl follow Markownikoff's rule.

481 (c)

Pent-3-yne is not correct; it is pent-2-yne;



482 (b)



484 (b)

It is Corey House synthesis of alkanes.

487 (b)

Like gets dissolved in like; alkane and benzene both are non-polar.

488 (a)

CH_4 cannot be prepared by Kolbe's electrolysis; HCOONa gives H_2 and CH_3COONa gives CH_4 .

490 (a)

F_2 reacts more violently.

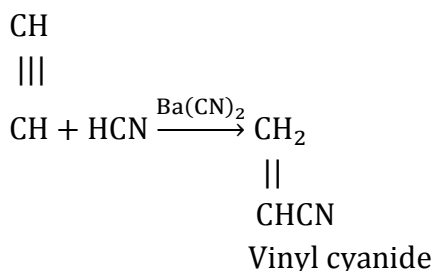
491 (a)

Markownikoff's as well as *anti*-Markownikoff's rules are valid for only asymmetric alkenes. 2-butene is a symmetric

alkene.

492 (c)

This is electrophilic addition of HCN molecular across $\text{C} \equiv \text{C}$ in presence of vinyl cyanide.



494 (d)

It is a new anti-knocking agent used in place of tetraethyl lead to control lead pollution by gasoline in developed countries.

496 (a)

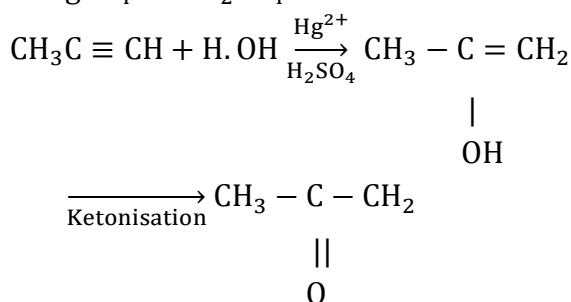
Angle strain in cyclopropane is $24^\circ 44'$

$$\begin{aligned} \theta &= \left[180 - \frac{360}{n} \right] \\ &= \left[180 - \frac{360}{3} \right] \\ &= 180 - 120 = 60^\circ \end{aligned}$$

$$\begin{aligned} \text{Angle strain } \alpha &= \frac{1}{2} [109^\circ 28' - \theta] \\ &= \frac{1}{2} [109^\circ 28' - 60^\circ] \\ &= 24^\circ 44' \end{aligned}$$

497 (a)

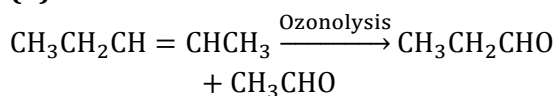
When propyne reacts with water in presence of HgSO_4 and H_2SO_4 acetone is formed.



498 (b)

If two different alkyl halides ($\text{R}_1 - \text{X}$ and $\text{R}_2 - \text{X}$) are used, a mixture of three alkanes is obtained which are difficult to separate

499 (d)



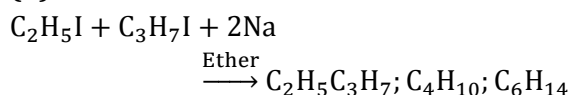
500 (c)

Chlorination of CH_4 is free radical mechanism.

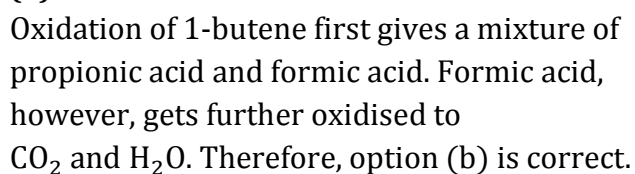
501 (d)

Unsaturated molecules decolourise Baeyer's reagent.

502 **(c)**
An alkene on reductive ozonolysis gives 2-
molecules of $\text{CH}_2(\text{CHO})_2$. Hence, the alkene is
1, 4-cyclohexadiene.



Friedel-Craft's acylation it involves the treatment of benzene with acetyl chloride or acetic anhydride in presence of anhydrous aluminium chloride.

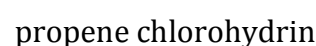


A compound is said to be aromatic if it meets
of the following criteria.

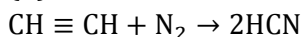
9. The cyclic system must contain $(4n + 2)\pi$ -electrons.

$$\text{CH}_3\text{CH} = \text{CH}_2 \xrightarrow{\text{B}_2\text{H}_6} (\text{CH}_3\text{CH}_2\text{CH}_2)_3\text{B} \xrightarrow{\text{H}_2\text{O}_2} \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{H}_3\text{BO}_3;$$

The process is called hydroboration.

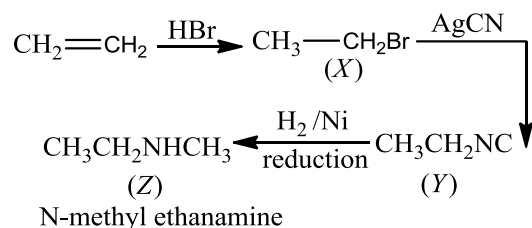
$$(i) \text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3 \xrightarrow[\text{H}_2\text{O}]{\text{O}_3, \text{Zn}}$$


521 (b)



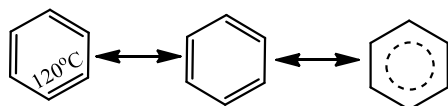
522 (a)

The reaction is as follows



523 (b)

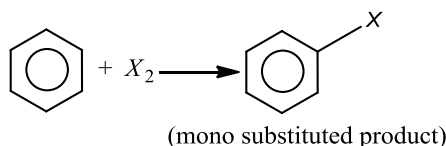
The structure of benzene is



Bond order

$$\begin{aligned} &= \frac{\text{number of bonds}}{\text{number of resonating structures}} \\ &= \frac{4}{3} = 1.33 \end{aligned}$$

Since, the bond order is in between single and double bond, thus, it contains delocalised π -bonds. Hence, it is not possible to obtain number of single and double bonds in benzene.

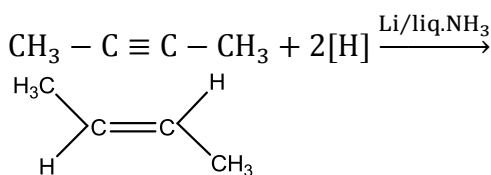


524 (d)

$-\text{NO}_2$ group withdraw electron from the ring shows $-M$ effect makes ring electron deficient, thus deactivates ring for electrophilic substitution.

525 (b)

Reaction of a non-terminal alkyne with a solution of an alkali metal (usually Na or Li or K) in liquid ammonia give a *trans*alkene.



526 (d)

B.p. increases with increase in mol. Wt.

527 (b)

10. Benzene undergoes electrophilic substitution in presence of

AlCl_3 or FeCl_3 or ZnCl_2 .

11. Benzene does not undergo addition reactions like alkene.

$\therefore \text{C}_6\text{H}_6 + \text{HOCl} \xrightarrow{\text{H}^+} \text{no product}$ and (b) is correct answer.

528 (d)

C – H bond energy is greatest in ethyne due to the presence of triple bond.

529 (b)

$\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$ is planer molecule due to $sp^2 - sp^2$ -hybridised carbon atoms.

530 (a)

TEL increases the octane no. of gasoline.

531 (d)

The refining of petroleum is distillation process.

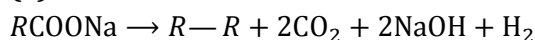
532 (b)

It is how Zn-Cu couple is used.

533 (b)

$\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$ is linear and symmetrical and thus, dipole moment is zero.

535 (a)



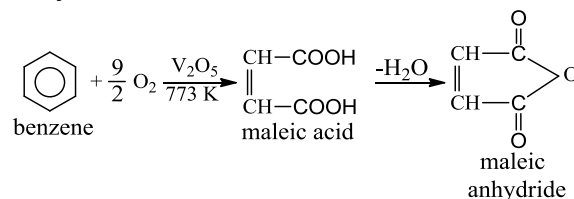
537 (b)

Only terminal alkynes give precipitate with ammoniacal silver nitrate solution.

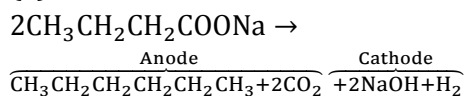
Among the given, $\text{CH}_3 - \text{C} \equiv \text{CH} - \text{CH}_3$ is not a terminal alkyne. Thus, it does not give precipitate with ammoniacal AgNO_3 .

539 (c)

Benzene vapours mixed with air when passed over V_2O_5 catalyst at 775 K gives maleic anhydride





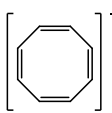
540 (a)



541 (d)

Compound has $8 + 2 = 10\pi$ electrons

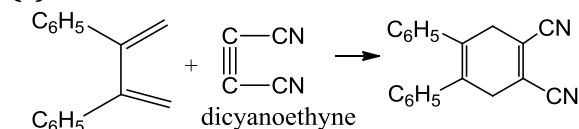
hence is aromatic.  has $4\pi e^-$,  has

$8\pi e^-$, while  has $8 + 1 = 9\pi e^-$, hence all these species are not aromatic

542 (b)

It is a mixture of solid hydrocarbons.

543 (c)



2,3-diphenyl-1,3-butadiene

This reaction is an example of Diel's Alder reaction

544 (d)

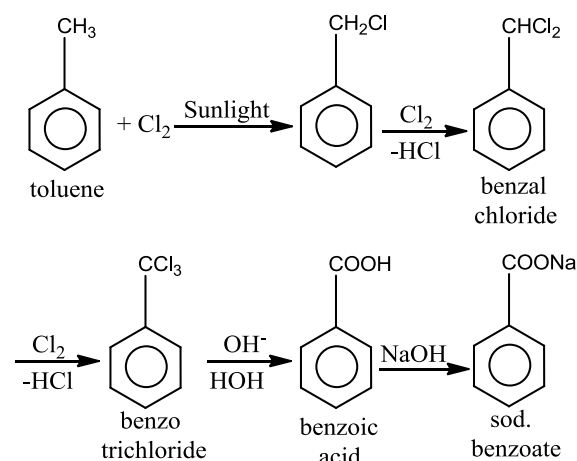
All of these can be used in cracking.

545 (b)

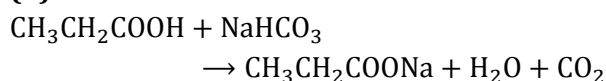
General formula of a cycloalkane is C_nH_{2n} .

546 (b)

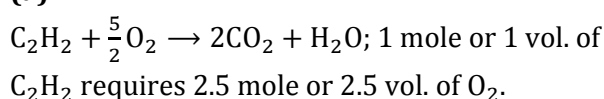
Toluene reacts with excess of Cl_2 in presence of sunlight, the last product of this reaction is benzotrichloride which on hydrolysis gives benzoic acid, and it gives sodium benzoate on reaction with NaOH.



548 (d)



549 (a)



550 (a)

Conjugate dienes are more stable than the other dienes.

551 (c)

Branched chain alkanes give rise to increase on

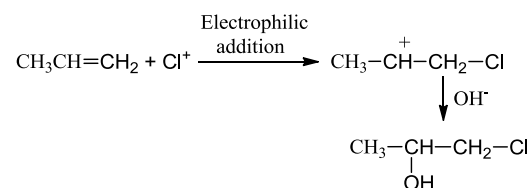
octane no.

552 (d)

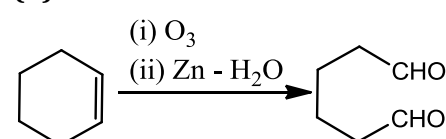
Follow Markownikoff's rule.

553 (b)

HOCl has Cl^+ and OH^- ions



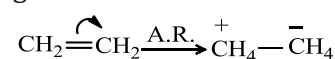
554 (b)



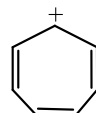
$Zn - H_2O$ is the reagent for reductive work up of ozonide. $H_2O_2 - CH_3COOH$ would give $HOOC - (CH_2)_4 - COOH$.


555 (d)

The π -bond is unshared in electromeric effect to give +ve and -ve centres on molecule.



556 (d)

 Tropylium cation is planar and have 6π -electron according to Huckel rule, hence it is aromatic.

 Cyclopentadienyl anion is planar and have 6π -electron, hence it is also aromatic compound.

557 (a)

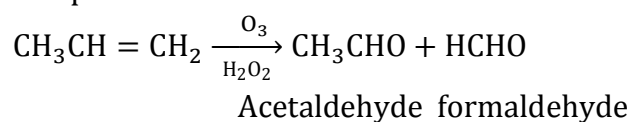
Follow peroxide effect.

558 (a)

In the laboratory, nitrobenzene is prepared by nitration of benzene with the mixture of nitric acid and sulphuric acid at temperature below $60^\circ C$. In which HNO_3 acts as a base

559 (d)

The reaction is ozonolysis. During the reaction $C = C$ breaks to give carbonyl compounds.



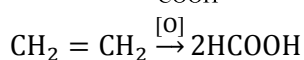
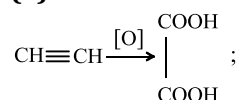
560 (a)

Petrol or gasoline contains mainly C₆ to C₁₁ atoms liquid alkanes.

562 (d)

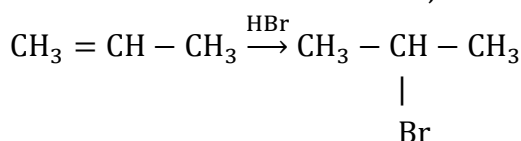
L.P.G. mainly contains butane and isobutane.

564 (a)



565 (a)

According to Markownikoff's rule, the negative part of the reagent gets attached to that double bonded carbon atom which has least number of H-atoms. Thus,

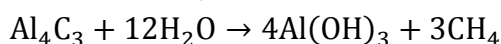


569 (b)

Gasoline contains alkanes from C₆ to C₁₁ carbon atom.

570 (d)

We know that,



Thus, in this reaction methane (CH₄) is produced.

571 (d)

Follow Saytzeff rule of elimination.

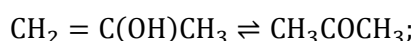
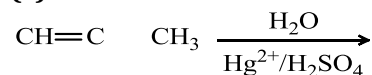
573 (b)

Impurities of PH₃ give garlic smell to C₂H₂.

574 (d)

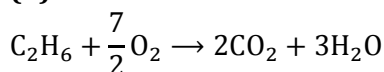
In the formation of an alkane from Grignard reagent, alkyl group always comes from Grignard reagent. Hence, the number of carbon atoms in the Grignard reagent and alkane formed Grignard reagent will be identical. So, the original alkyl halide is propyl bromide.

575 (c)

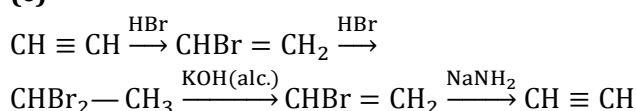


The mechanism involves tautomerism.

576 (d)

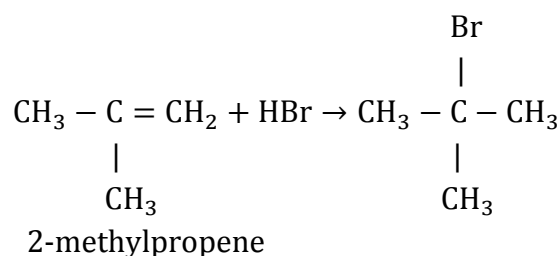


577 (c)



578 (d)

According to Markownikoff's rule the addition of a reagent (HX) to an unsymmetrical alkene takes place in such a way that the negative part of the reagent will be attached to that carbon atom which contains lesser number of H-atom.



579 (b)

Follow text.

580 (a)

Br₂ solution is decolourized by alkene or alkyne or molecules having unsaturation.

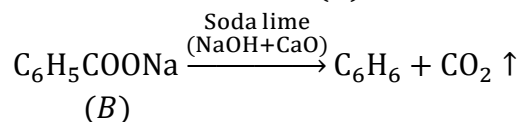
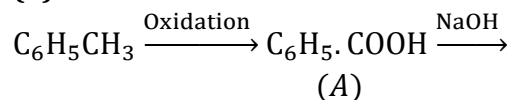
581 (c)

Eqs. (i) and (ii) drawings are Sawhorse and Newman projections respectively for staggered forms.

582 (a)

C₂H₂ gives white ppt. with amm. AgNO₃.

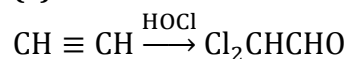
583 (b)



585 (c)

Cyclobutadiene have (4π) conjugated or delocalized electrons, thus it is *anti*-aromatic

586 (a)



587 (c)

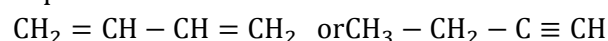
Thioalcohol (mercaptans) have unpleasant odour; C₂H₅SH is commonly used.

588 (c)

Octane no. of triptane or 2, 3, 3-trimethylbutane = 124; octane no. of *n*-nonane = 45.

589 (d)

C₄H₆ may contains either two double bond or triple bond



590 (b)

Due to acidic—H-atom propyne forms CH₃—C≡CNa with Na.

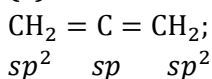
591 (b)

More is b.p. lesser is volatile nature.

592 (d)

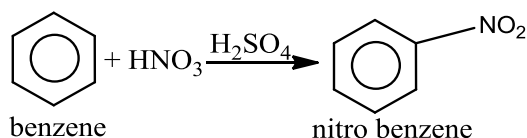
These all are used to increase octane number of fuel.

594 (a)



600 (b)

Benzene undergoes electrophilic substitution reaction. It is nitrated by HNO_3 .



602 (b)

Markownikoff's rule is for addition of unsymmetrical additive on unsymmetrical alkene.

603 (d)

Paraffin wax are solid hydrocarbons from C_{20} to C_{30} atoms.

605 (d)

Methane is called marsh gas because it is found in swamps or marshy places and can be obtained by bacterial decomposition of fossils of plants and animals.

606 (b)

Among hydrocarbons, alkynes are easily oxidised.

607 (d)

B.P. change with branching.

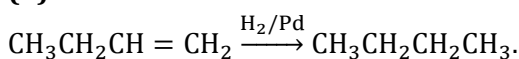
608 (f)

These are few oxidants.

609 (a)

The acidic character of H is,
 $\text{F}-\text{H} > \text{O}-\text{H} > \text{C}_{\text{sp}}-\text{H} > \text{N}-\text{H}$; H-atom attached on F, O, N and triply bonded carbon is acidic.

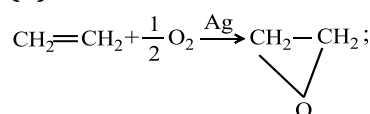
610 (b)



611 (c)

Except acetylene, all terminal alkynes have only one acidic H-atom.

613 (d)



These compounds are known as epoxy ethane or oxirane or cyclic ethers.

614 (b)

According to X-ray analysis all carbon-carbon bond distance (1.397\AA) are equal in benzene. The bond order of carbon-carbon bond is 1.5 in benzene.

Hence, carbon-carbon bond distance (1.397\AA) is less than C – C single bond (1.54\AA) and more than C = C double bond (1.33\AA).

615 (c)

Cracking involves decomposition of higher alkanes to lower one on heating.

616 (a)

Follow mechanism of Wurtz reaction.

617 (c)

CH_4 is a constituent of bio-gas.

620 (a)

The lowest temperature at which an oil gives sufficient vapours to form an explosive mixture with air is referred as flash point. It is 44°C , 35°C , 22.8°C in India, France and England, respectively.

621 (a)

Lindlar's catalyst is Pd – CaCO_3 deactivated by lead acetate. Cram *et. al* gave a better catalyst for this purpose as Pd – BaSO_4 poisoned by quinoline. This too is sometimes referred as Lindlar's catalyst.

622 (b)

Remember this value.

623 (a)

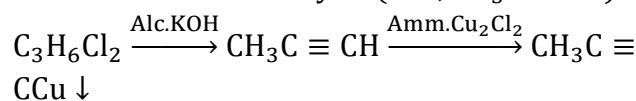
The aldehydes formed are oxidized by H_2O_2 formed during hydrolysis.

625 (c)

The acidic nature is $\text{H}_2\text{O} > \text{C}_2\text{H}_2 > \text{NH}_3$; thus, conjugate base order will be $\text{OH}^- > \text{C}_2\text{H}^- > \text{NH}_2^-$.

628 (d)

'X' is a three carbon compound with two halogen atom, so its molecular formula is $\text{C}_3\text{H}_6\text{Cl}_2$. Only terminal alkynes give red ppt. with ammoniacal Cu_2Cl_2 , so the hydrocarbon produced by the reaction of 'X' with alc. KOH, must be a terminal alkyne (*i. e.*, $\text{CH}_3\text{C}\equiv\text{CH}$).

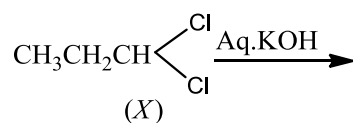
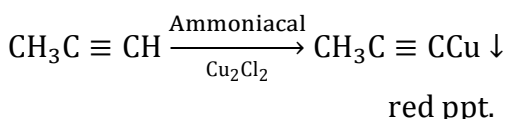
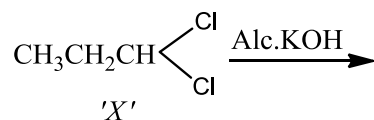
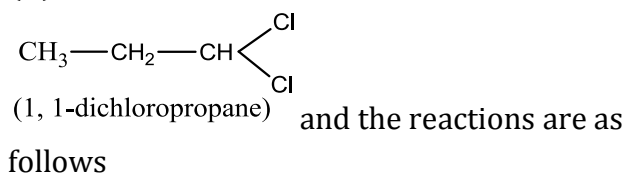


red

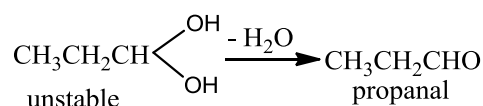
ppt.

Compound (X) gives an aldehyde when reacts with aqueous KOH. This suggests that both the halogens are present on same terminal

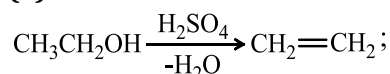
carbon atom. Thus, the formula of compound (X) is



1, 1-dichloropropane



629 (a)



Removal of H_2O is called dehydration.

630 (d)

Both vegetable and animal matter are origin of petroleum.

631 (d)

All are used in drying alkanes.

632 (b)

The stability order is:

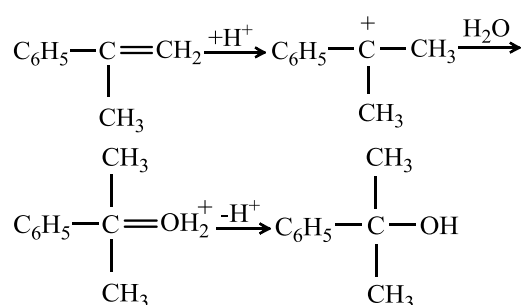
Staggered > skew > eclipsed

633 (d)

Cyclic hydrocarbon, with carbon-carbon bond length between 1.34\AA and 1.54\AA , is benzene in which due to resonance, C – C, bond length is 1.39\AA (ie., between $1.34\text{\AA} - 1.54\text{\AA}$). Benzene is a hexagonal molecule with bond-angle equal to 120° .

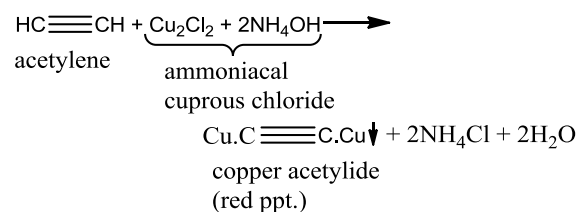
634 (c)

The reaction proceeds via carbocation mechanism.



635 (c)

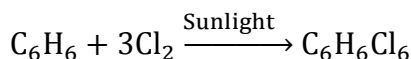
Copper and silver alkylides are obtained by passing to alkynes in the ammoniacal solution of cuprous chloride and silver nitrate respectively. These reactions are used for detecting the presence of acetylenic hydrogen atom.



So, alkanes and alkenes remain unaffected.

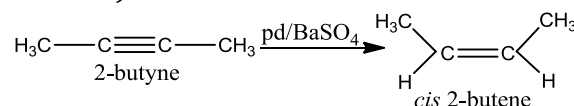
636 (b)

Benzene reacts with chlorine in presence of sunlight to give gammexane or benzene hexachloride.



637 (a)

Hydrogenation in presence of Pd and BaSO_4 as *syn* addition and with Na and liquid NH_3 at 200 K is anti addition (*trans* compounds are formed.)

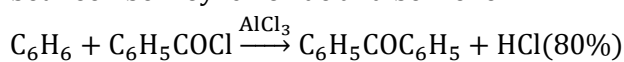


638 (c)

In benzene all the six carbon atoms are sp^2 hybridised. Out of these three sp^2 hybrid orbitals of each C-atom, two orbitals overlap with sp^2 hybrid orbitals of adjacent C-atoms to form six C – C single bonds. The remaining sp^2 orbital of each C-atom overlaps with s-orbitals of each H-atom to form six C – H single sigma bonds. Each C-atom is now left with one unhybridised p-orbital perpendicular to the plane of the ring.

640 (b)

Benzophenone (diphenyl ketone) can be prepared by the Friedel-Crafts' condensation between benzoyl chloride and benzene



641 (a)

Aromatic compounds have delocalised π -electrons.

Out of given choices cyclohexane, CH_4 , C_2H_6

and benzene, only benzene is aromatic compound. Benzene has six delocalised π -electrons.

642 (c)

Trivial name is allyl.

643 (d)

These are all facts.

644 (a)

The reactivity order for sulphonation of H-atom in alkane :

$3^\circ > 2^\circ > 1^\circ$.

645 (a)

As the $-\text{CH}_3$ group increases boiling point decrease

647 (b)

Alcoholic KOH is a dehydrohalogenating reagent, so when *n*-propyl bromide is treated with alcoholic KOH, propene is obtained.

$\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{alc KOH}$

n-propyl bromide

$\rightarrow \text{CH}_3\text{CH}=\text{CH}_2 + \text{HBr}$

propene

648 (b)

654 (d)

Alkene is $\text{CH}_3\text{CH}=\text{CHCH}_3$, a symmetrical alkene and therefore alcohol is,

$\text{CH}_3\text{CH}_2\text{CHCH}_3$ which will give alkene-2 as major product.



655 (b)

Cyclodecapentaene and Cyclooctatetraene both are nonaromatic. Cyclobutadiene is antiaromatic while benzene having 6π -electrons is aromatic

656 (d)

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$;

$(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{CH}_3$;

$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$;

$(\text{CH}_3)_3\text{CCH}_2\text{CH}_3$; $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)_2$

657 (f)

These are facts about alkanes.

658 (c)

Due to resonance, benzene is quite stable and in spite of three double bonds does not decolourise Br_2 water.

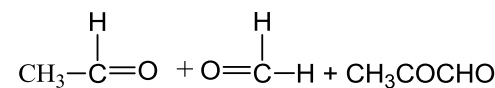
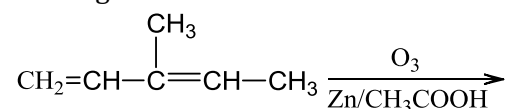
659 (c)

Follow peroxide effect.

660 (d)

The reaction is Wurtz's type reaction.

Knowing the number and arrangement of carbon atoms in aldehydes and ketones the structure of the original alkene can be worked out.



649 (a)

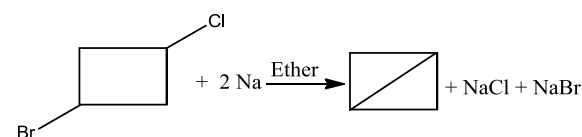
A method used during II world war.

650 (d)

Ozonolysis of these two produces different products.

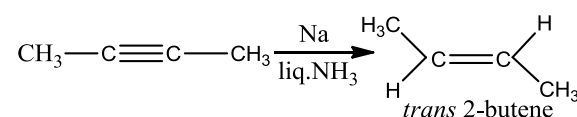
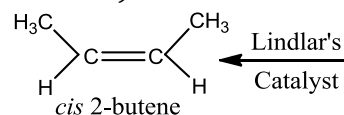
652 (c)

For simplest alkyne $n=2$; thus, alkyne is $\text{C}_n\text{H}_{2n-2}$ or C_2H_2 .



661 (a)

Alkynes give different products with different reducing agents *e.g.*, with Lindlar's catalyst (Pd/BaSO_4) or Ni *cis*-alkene is formed but with Na in liquid NH_3 (Birch reduction) *trans* alkene is formed.

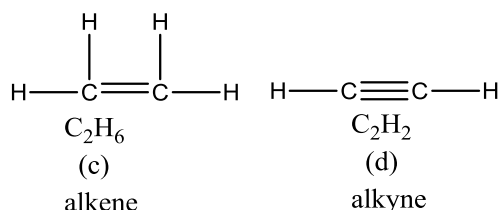
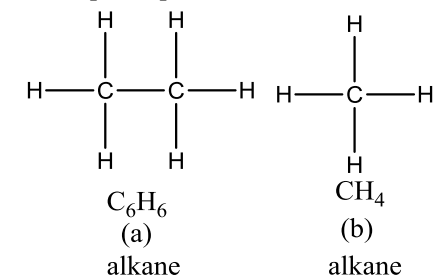


662 (c)

(i) Alkene and alkynes both react with KMnO_4 and decolourise it.

(ii) Only alkynes react with AgNO_3 to give

white precipitate.



$\therefore \text{C}_2\text{H}_4$ (an alkene) reacts with KMnO_4 and decolourises it and does not react with AgNO_3 , C_2H_6 and CH_4 are alkane they do not react with KMnO_4 and NaOH .

663 (c)

It has maximum octane no.

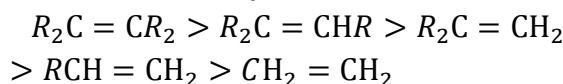
664 (c)

Pure C_2H_2 has ethereal odour.

666 (a)

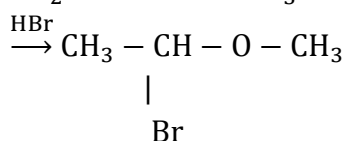
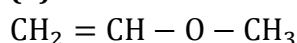
Alkylated alkenes are more stable. More the alkylation of alkene, more will be its stability.

\therefore Order of stability of alkenes is

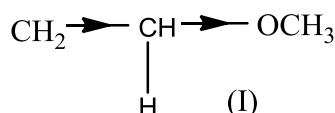


\therefore Tetra alkylated alkene is most stable.

668 (d)

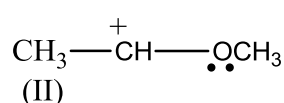


First protonation occurs, two possible intermediates are



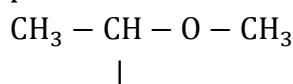
(-I effect destabilizes carbocation)

and



(+M effect stabilizes carbocation)

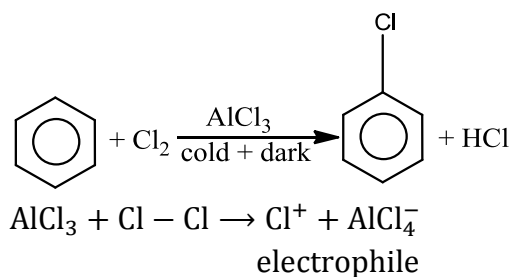
II, is more favourable. Hence, Br^- attacks, and product is



Br

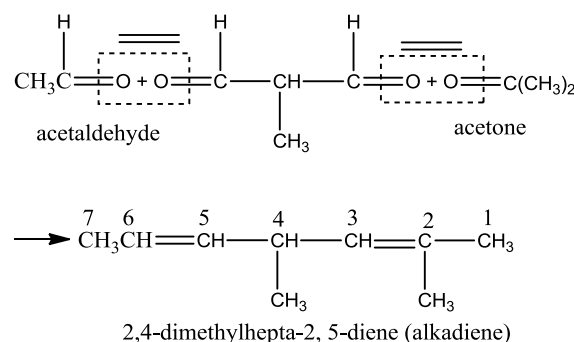
670 (b)

Halogenation of benzene in cold and dark is carried by electrophilic substitution. In this reaction, Cl^+ electrophile takes part in the reaction.



671 (a)

Since the alkadiene on reductive ozonolysis gives acetaldehyde (CH_3CHO), acetone (CH_3COCH_3) and 2-methylpropane-1, 3-dial [$\text{OHCCH}(\text{CH}_3)\text{CHO}$], the structure of alkadiene will be obtained as



672 (b)

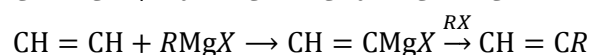
These are Fischer-Tropsch and Berzlius method for synthesis of petrol.

673 (c)

It is an unsaturated two carbon atom molecule (gives catalytic hydrogenation) but not acetylene (does not give white ppt. with amm. AgNO_3).

Thus, it is ethylene.

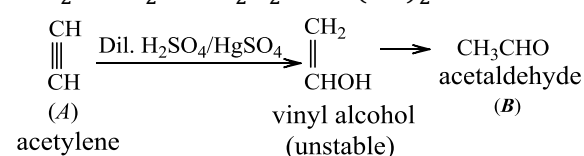
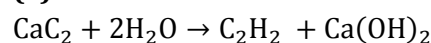
674 (c)



675 (b)

Addition of HBr first takes place round double bond.

677 (a)

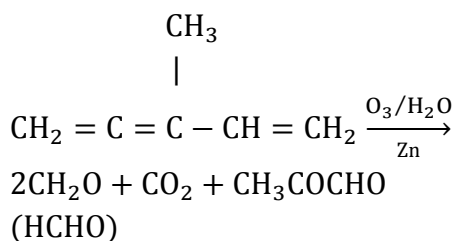
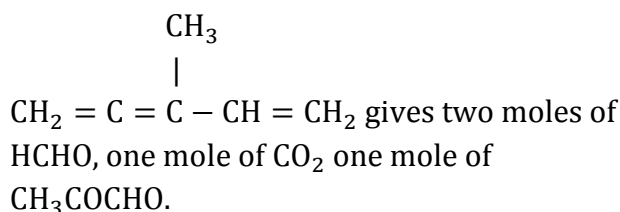


678 (c)

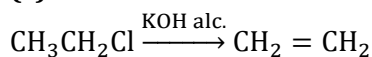
An alkyne has higher b.p. than corresponding alkene and an alkene has higher b.p. than corresponding alkane.

681 (d)

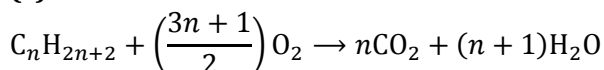
On ozonolysis,



682 (c)



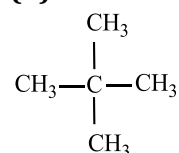
683 (c)



685 (b)

Cycloalkanes are isomeric with alkenes because they have same general formula C_nH_{2n} (*i.e.*, same molecular formula) but possessing different structures. They show ring chain isomerism.

686 (b)



is symmetrical alkane and will give only one monochloro substitution.

688 (d)

Rest all are used to convert $>\text{CO}$ gp. to CH_2 .

689 (d)

The presence of the chlorine atom on benzene ring makes the second substituent enter at *ortho* or *para* position because the chlorine atom is *ortho* – *para* directing.

690 (a)

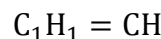
$$\text{Given, } \text{C} = \left(\frac{12}{13}\right) \times 100\%, \text{ H} = \left(\frac{1}{13}\right) \times 100\%$$

$$\therefore \text{C} = 92.3\% \text{ H} = 7.69\%$$

$$\text{C} = \frac{92.3}{12} = 7.69 = \frac{7.69}{7.69} = 1$$

$$\text{H} = \frac{7.69}{1} = 7.69 = \frac{7.69}{7.69} = 1$$

\therefore Empirical formula of hydrocarbon is



$\therefore A$ has empirical formula CH and decolourises bromine water.

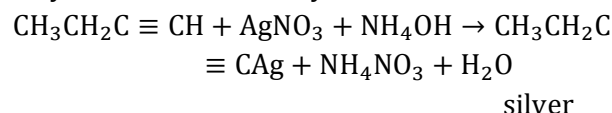
\therefore It is alkyne which is C_2H_2 .

$\therefore B$ has empirical formula CH and does not decolourise bromine water.

\therefore It is benzene C_6H_6 .

691 (c)

Due to acidic nature of the hydrogen atoms attached to a triple bond, acetylenes and terminal alkynes form metal acetylides



butynide

693 (b)

Cetane no. represent percentage of *n*-hexadecane in mixture.

694 (c)

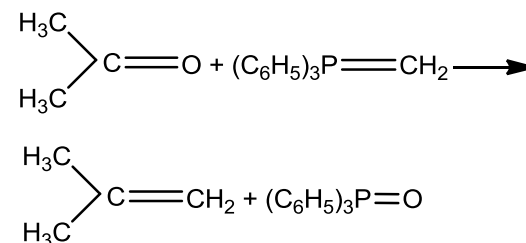
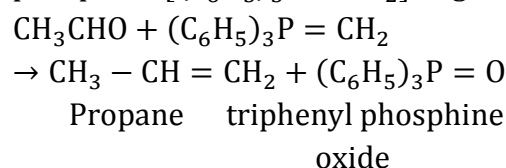
Conjugated alkadienes show 1 : 2 and 1 : 4 addition.

695 (d)

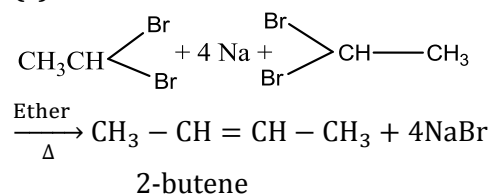
$\text{Na}/\text{C}_2\text{H}_5\text{OH}$, LiAlH_4 or NaBH_4 are used for this purpose.

696 (c)

This is also a mean of preparing alkene where the position of the double bond is definite. In Wittig reaction, aldehyde ($-\text{CHO}$) and ketone ($>\text{C}=\text{O}$) react with methylene triphenyl phosphine $[(\text{C}_6\text{H}_5)_3\text{P}=\text{CH}_2]$ to give alkene.



697 (c)



699 (d)

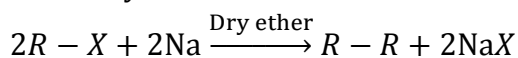
Octane number is a measure of quality of fuel.

700 (d)

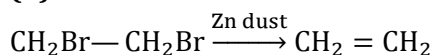
All possible products are obtained; C_2H_6 by CH_3COO^- ; C_4H_{10} by $CH_3CH_2COO^-$ and $CH_3CH_2CH_3$ by CH_3COO^- and $CH_3CH_2COO^-$.

701 (b)

Wurtz reaction is used to prepare alkanes from alkyl halides.



702 (b)



703 (a)

A group that causes attack to occur chiefly at positions *ortho* and *para* to it, is called an *ortho - para* director, e. g., NH_2 , OH , Cl etc.

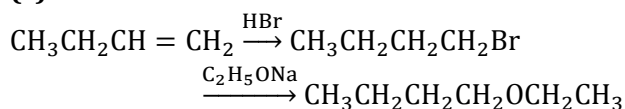
704 (c)

NH_3 is base, i. e., least acidic.

705 (c)

This is Wurtz reaction.

706 (c)



707 (c)

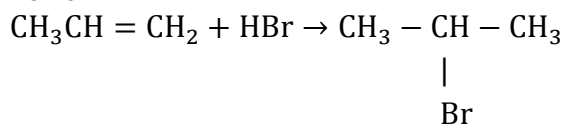
1,1-dibromocyclooctane possess lesser strain.

710 (d)

___do___

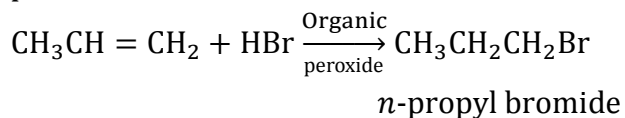
712 (c)

According to Markownikoff's rule, the addition of an unsymmetrical reagent (HX) to an unsymmetric alkene takes place in such a way that the negative part of the reagent will be attached to the carbon atom which containing lesser number of H-atom. Hence, it is best applicable to the reaction between C_3H_6 and HBr .



713 (b)

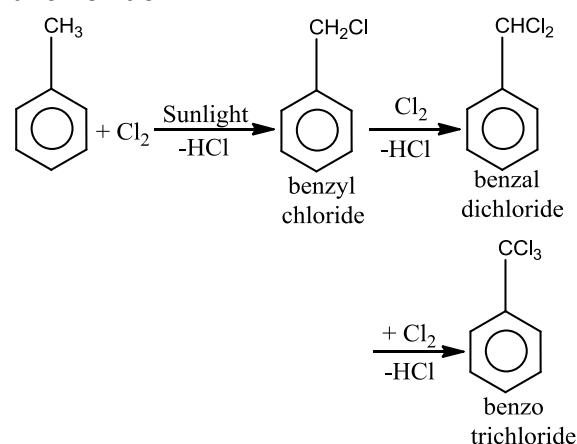
The addition of propene to HBr opposes the Markownikoff's rule in presence of organic peroxide.



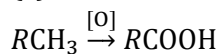
It is also called the Kharash effect or *anti*-Markownikoff's rule.

715 (d)

In presence of sunlight toluene undergoes aliphatic substitution with chlorine and give benzyl chloride, benzal chloride and benzo trichloride.



716 (c)



717 (d)

Uses of ethene.