

Previous Years Examination Questions

✍ 1 Mark Questions

1. In a $p-n$ junction diode, the forward bias resistance is low as compared to the reverse bias resistance. Give reason.

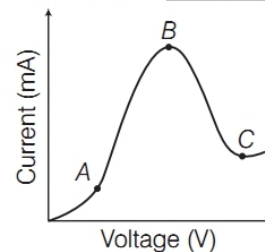
All India 2020

2. Can a slab of p -type semiconductor be physically joined to another n -type semiconductor slab to form $p-n$ junction? Justify your answer. **All India 2020**

3. The ability of a junction diode to an alternating voltage, is based on the fact that it allows current to pass only when it is forward biased. **Delhi 2020**

4. The, a property of materials C, Si and Ge depends upon the energy gap between their conduction and valence bands. **Delhi 2020**

5. The graph shown in the figure represents a plot of current *versus* voltage for a given semiconductor. Identify the region, if any over which the semiconductor has a negative resistance. **All India 2013**



6. What is the difference between a n -type and a p -type extrinsic semiconductor?

Delhi 2012C

7. What happens to the width of depletion layer of a $p-n$ junction when it is

- (i) forward biased?
- (ii) reverse biased? **All India 2011**

8. Why cannot we take one slab of p -type semiconductor and physically join it to another slab of n -type semiconductor to get $p-n$ junction? **All India 2010C**

2 Marks Questions

9. What is meant by doping of an intrinsic semiconductor? Name the two types of atoms used for doping of Ge/Si.

CBSE 2022 (Term-II)

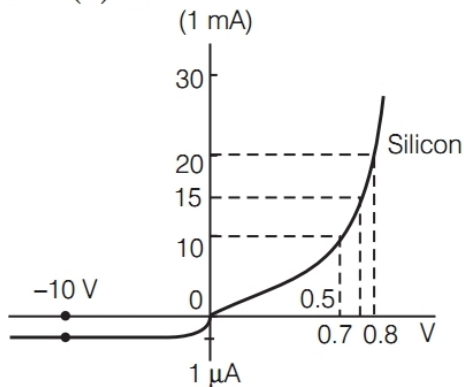
10. Explain the formation of the barrier potential in a $p-n$ junction. CBSE 2022 (Term-II), All India 2020

11. Explain the formation of depletion region in a $p-n$ junction. CBSE 2022 (Term-II), Delhi 2011

12. (i) Explain the formation of energy bands in crystalline solids.
(ii) Draw the energy band diagrams of (a) a metal and (b) a semiconductor.

13. A student wants to use two $p-n$ junction diodes to convert alternating current into direct current. Draw the labelled circuit diagram she would use and explain how it works? CBSE 2018

14. The $V-I$ characteristic of a silicon diode is as shown in the figure. Calculate the resistance of the diode at (i) $I = 15$ mA and (ii) $V = -10$ V

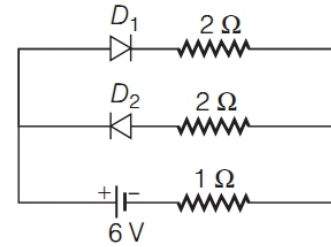


Foreign 2015

15. Distinguish between 'intrinsic' and 'extrinsic' semiconductors? All India 2015
16. Explain, with the help of a circuit diagram, the working of a $p-n$ junction diode as a half-wave rectifier. All India 2014
17. Draw energy band diagram of n -type and p -type semiconductor at temperature $T > 0$ K. Mark the donor and acceptor energy level with their energies. Foreign 2014

18. Distinguish between a metal and an insulator on the basis of energy band diagram. Foreign 2014

19. Assuming that the two diodes D_1 and D_2 used in the electric circuit shown in the figure are ideal, find out the value of the current flowing through 1Ω resistor.



Delhi 2013C

20. Write two characteristic features to distinguish between n -type and p -type semiconductors. All India 2012

21. How is forward biasing different from reverse biasing in a $p-n$ junction diode?

Delhi 2011

22. Draw the circuit diagram showing how a $p-n$ junction diode is (i) forward biased (ii) reverse biased

How is the width of depletion layer affected in the two cases? All India 2011C

23. Carbon and silicon both have four valence electrons each, then how are they distinguished? Delhi 2011C

3 Marks Questions

24. With the help of a circuit diagram explain the working of a $p-n$ junction diode as a full-wave rectifier. Also draw its input and output waveforms. CBSE 2022 (Term-II)

25. Explain the formation of potential barrier and depletion region in a $p-n$ junction diode. What is effect of applying forward bias on the width of depletion region?

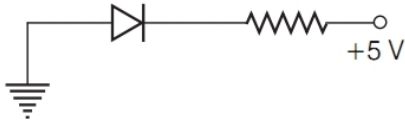
Delhi 2020

26. Draw the circuit diagram of a full wave rectifier and explain its working. Also, give the input and output waveforms.

Delhi 2019

27. Draw the circuit diagram of a full wave rectifier. Explain its working principle. Show the input waveforms given to the diodes D_1 and D_2 and the corresponding output waveforms obtained at the load connected to the circuit. All India 2019

28. (i) In the following diagram, is the junction diode forward biased or reverse biased?



(ii) Draw the circuit diagram of a full wave rectifier and state how it works? All India 2017

29. Write the two processes that take place in the formation of a $p-n$ junction. Explain with the help of a diagram, the formation of depletion region and barrier potential in a $p-n$ junction. Delhi 2017

30. (i) Explain with the help of a diagram the formation of depletion region and barrier potential in a $p-n$ junction.

(ii) Draw the circuit diagram of a half-wave rectifier and explain its working. All India 2016

31. (i) Distinguish between n -type and p -type semiconductors on the basis of energy band diagrams.

(ii) Compare their conductivities at absolute zero temperature and at room temperature. Delhi 2015C

32. Draw the energy band diagrams of

(i) n -type and

(ii) p -type semiconductor at temperature, $T > 0K$.

In the case n -type Si semiconductor, the donor energy level is slightly below the bottom of conduction band whereas in p -type semiconductor, the acceptor energy level is slightly above the top of the valence band. Explain, what role do these energy levels play in conduction and valence bands. All India 2015C

33. Write any two distinguishing features between conductors, semiconductors and insulators on the basis of energy band diagrams. All India 2014

34. Draw the circuit diagram of a full-wave rectifier using $p-n$ junction diode. Explain its working and show the output input waveforms. Delhi 2012

35. Draw a labelled diagram of a full-wave rectifier circuit. State its working principle. Show the input-output waveforms. All India 2011

36. Name the important processes that occurs during the formation of a $p-n$ junction. Explain briefly, with the help of a suitable diagram, how a $p-n$ junction is formed. Define the term 'barrier potential'?

Foreign 2011

5 Marks Questions

37. (i) Explain with the help of suitable diagram, the two processes which occur during the formations of a $p-n$ junction diode. Hence, define the terms (i) depletion region and (ii) potential barrier.

(ii) Draw a circuit diagram of a $p-n$ junction diode under forward bias and explain its working. 2018C

38. (i) State briefly the processes involved in the formation of $p-n$ junction, explaining clearly how the depletion region is formed.

(ii) Using the necessary circuit diagrams, show how the $V-I$ characteristics of a $p-n$ junction are obtained in
(a) forward biasing
(b) reverse biasing

How are these characteristics made use of in rectification? Delhi 2014

39. (i) Explain with the help of diagram, how a depletion layer and barrier potential are formed in a junction diode.

- (ii) Draw a circuit diagram of a full-wave rectifier. Explain its working and draw input and output waveforms.

Delhi 2014C

- 40.** (i) How is a depletion region formed in p - n junction?
- (ii) With the help of a labelled circuit diagram. Explain how a junction diode is used as a full-wave rectifier. Draw its input, output waveforms.
- (iii) How do you obtain steady DC output from the pulsating voltage? **Delhi 2013C**