



PHYSICS

BOOKS - BETTER CHOICE PUBLICATION

ELECTRONIC DEVICES SOLIDS

Very Short Answer Type Questions

1. What is meant by doping? Why is it done?



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2. What is Fermi energy level ?



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3. What is a hole? Which doping creates a hole?
hole?



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4. What is Fermi energy level ?



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5. What are the majority current carriers of N-type semiconductors.



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6. What are the majority current carriers of N-type semiconductors.



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7. Draw a lattice structure of an intrinsic semiconductor.



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8. What is conduction band ?



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9. What is valence band ?



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10. What is an intrinsic Semi-conductor ?



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11. What is an Extrinsic Semi-conductor ?



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12. Draw the energy-band diagram of p-type semiconductor.



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13. Draw the energy-band diagram for an insulator.



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14. What type of impurity is added to obtain N-Type and P-Type semi conductors ?



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15. Why does the rate of a reaction increase with rise in temperature?



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Short Answer Type Questions

1. Distinguish between n-type and p-type semiconductors.



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2. Distinguish between intrinsic and extrinsic semiconductors.



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3. Explain the effect of temperature on the resistivity of pure semiconductors.



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4. What are 'holes'? Write their characteristics.



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5. What do you mean by hole in a semiconductor? Write its three characteristics.



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6. Distinguish between energy levels and energy bands.



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7. What is the difference between a single crystal and polycrystal ?



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8. Define doping .Write two mehtods of dping?



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9. On the basis of the energy band diagrams distinguish between metals, insulators and

semiconductors.



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10. What are extrinsic semiconductor ? Explain acceptor-type semi-conductors.



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11. What are extrinsic semiconductors?
Describe p-type semiconductor?



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12. Explain various energy bands in an atom.



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13. What is doping ? Write three necessary conditions for it and two methods of doping.



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14. Distinguish between conductor and semiconductor on the basis of their energy bands.



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15. What are extrinsic semi-conductors ? Explain donor type semi-conductor.



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16. Distinguish between intrinsic and extrinsic semiconductors.



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Long Answer Type Questions

1. Explain the behaviour of semiconductors and insulators on the basis of energy bands in solids.



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2. What are extrinsic semiconductors ? Explain how p-type and n-type semiconductors are formed ?



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Numerical Problems

1. A semiconductor has acceptor level 1.57 eV above the valence band. What is the maximum wavelength of light required to create a hole?

Given that $1eV = 1.6 \times 10^{-19} J$ and

$$h = 6.62 \times 10^{-34} Js.$$



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2. The energy liberated in the combination of a hole-electron pair is converted into electromagnetic radiation. What is the band gap, if the maximum wavelength for the radiation emitted is 820 nm? Given that $1eV = 1.6 \times 10^{-19} J$ and

$$h = 6.62 \times 10^{-34} Js.$$



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3. The energy gap of silicon is 1.14 eV. Find the maximum wavelength, at which silicon starts energy absorption. Give that $1\text{eV} = 1.610^{-19}\text{J}$ and $h = 6.62 \times 10^{-34}\text{Js}$.



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4. The energy liberated in the recombination of hole-electron pair is converted into electromagnetic radiation. If the maximum wave

length emitted is 600 nm, find the value of forbidden energy gap.



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5. The energy liberated in the recombination of hole-electron pair is converted into electromagnetic radiation. If the maximum wavelength emitted is 500 nm, find value of forbidden energy gap.



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6. The energy liberated in the recombination of hole-electron pair is converted into electromagnetic radiation. If the maximum wavelength emitted is 500 nm, find value of forbidden energy gap.



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7. In a sample of semi conductor mobilities of electrons and holes are $24 \times 10^3 \text{ cm}^2 \text{ V}^{-1} \text{ S}^{-1}$ and $0.2 \times 10^3 \text{ cm}^2 \text{ V}^{-1} \text{ S}^{-1}$ respectively. If the density of electrons is $0.8 \times 10^{14} \text{ cm}^{-3}$ and

that of holes is $0.4 \times 10^{14} \text{ cm}^{-3}$. Find the nature of semi-conductor and its conductivity.



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Most Expected Questions

1. Why semiconductors are doped?



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2. What is forbidden energy gap?



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3. What is electron mobility?



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4. What is a p-type semiconductor?



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5. Which has higher mobility, electron or hole?



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6. What is the effect of temperature on the particles ?



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7. A n-type semiconductor is:



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8. What is donor energy level? Explain.



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9. How does conductivity of a semi conductor change with the rise in temperature ?



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