



PHYSICS

BOOKS - PUNJAB BOARD PREVIOUS YEAR PAPERS

Solids

Exercise

1. 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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2. 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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3. The energy liberated in the recombination of hole-electron pair is converted into electromagnetic radiation. If the maximum wave length emitted is 400 nm, find the value of forbidden energy gap.



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4. A semiconductor has electron concentration of $4 \times 10^{12} \text{ cm}^{-3}$ and hole concentration of

$7 \times 10^{-3} \text{cm}^{-3}$. Is the semiconductor n-type or p-type ?



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5. A semiconductor has electron concentration of $4 \times 10^{12} \text{cm}^{-3}$ and hole concentration of $7 \times 10^{-3} \text{cm}^{-3}$. Calculate conductivity of the semiconductor if electron mobility = $22000 \text{cm}^2 \text{V}^{-1} \text{s}^{-1}$ and hole mobility = $150 \text{cm}^2 \text{V}^{-1} \text{s}^{-1}$.



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6. A semiconductor has electron concentration of $8 \times 10^{-13} \text{ cm}^{-3}$ and hole concentration of $4 \times 10^{-12} \text{ cm}^{-3}$. Is the semiconductor p-type or n-type ?



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7. A semiconductor has electron concentration of $8 \times 10^{-13} \text{ cm}^{-3}$ and hole concentration of $4 \times 10^{-12} \text{ cm}^{-3}$. Calculate conductivity of the sample if electron mobility =

$24000\text{cm}^2\text{V}^{-1}\text{s}^{-1}$ and hole mobility = $200\text{cm}^2\text{V}^{-1}\text{s}^{-1}$ and $e = 1.6 \times 10^{-19}\text{C}$.



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8. 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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9. Draw a lattice structure of an intrinsic semiconductor.



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10. What is conduction band ?



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11. What is doping ?





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12. What is valence band ?



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13. What is an intrinsic Semi-conductor ?



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14. What is doping ?





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15. What is an Extrinsic Semi-conductor ?



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



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



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18. What is Fermi energy level ?



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19. What is doping ?



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20. What do you mean by the term doping in semiconductors ?



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



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22. What is the effect of rise in temperature on the conductivity of copper and silicon ?



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23. What is an Extrinsic Semi-conductor ?



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24. What is n-type semiconductor ?



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25. What do you mean by p-type semi conductor ?



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26. Choose the correct option: Electrical conductivity of a semi conductor -

A. decreases with rise in its temperature.

B. increases with rise in its temperature.

C. does not changes with temperature.

D. first decreases and then increases with
rise in temperature.

Answer:



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27. Choose the correct option : A pure
semiconductor behaves slightly as a
conductor at :

A. high temperature

B. room temperature

C. low temperature

D. none of these

Answer:



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28. For metal conductors, the electrical resistivity decreases with the rise in temperature.(True/False)



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29. p-type semiconductor is obtained by doping silicon with Indium(In).(Yes/No)



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



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31. Explain various energy bands in an atom.



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



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

bands.



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



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



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36. Distinguish between energy levels and energy bands.



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



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



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39. Distinguish between intrinsic and extrinsic semiconductors.



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



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



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42. Define hole. Give its two characteristics.



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43. Distinguish between intrinsic and extrinsic semiconductors.



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



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



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



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



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



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49. Explain the band theory of solids.



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50. What are extrinsic semiconductors ?

Explain how p-type and n-type semiconductors are formed ?



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