

2024

2nd Semester Examination

ELECTRONICS (Honours)

Paper : C 3-T

(Applied Physics)

[CBCS]

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any **five** questions.

2×5=10

1. State Heisenberg's uncertainty principle.
2. What do you mean by the primitive cells in crystal structure?
3. Define specific heat of solid.
4. What do you mean by wave-particle duality?
5. What is Bose condensation?

P.T.O.

(2)

6. Define dielectric constant of a material.
7. What do you mean by direct band-gap semiconductors?
8. Define Curie temperature.

Group - B

Answer any **four** questions. 5×4=20

9. What do you mean by a reciprocal lattice? Find relation between direct and reciprocal lattices. 2+3
10. Write a short note on Compton effect.
11. Define Miller indices of a set of plane in a crystal. Using proper formula show that the ratio of the inter planar spacings of (100), (110) and (111) planes is $\sqrt{6}:\sqrt{3}:\sqrt{2}$. 2+3
12. State and prove the third law of thermodynamics. 2+3
13. What do you mean by Seebeck and Peltier effect? What is thermoelectric EMF? 2+2+1
14. What do you mean by phase space? Explain macroscopic states and microscopic states with suitable examples. 2+3

Group - C

Answer any **one** question. 10×1=10

15. Assuming particle in a one dimensional infinitely deep potential well find the energy levels and wave function.

(3)

Also plot the eigen-functions in the well corresponding to first three energy states. 7+3

16. What do you mean by holes in semiconductor? What do you mean by electronic density of states? Explain with E-k diagram, how the Fermi levels and density of states are affected for n and p-type semiconductors in relation to intrinsic semiconductors. 2+2+6
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