

Question 1

Answer the following 2×10

- (a) What is the function of a cyclotron?
- (b) Why visible light is unsuitable for diffraction by crystalline solids?
- (c) Define forbidden gap.
- (d) Between insulators and semiconductors, which has greater forbidden gap?
- (e) What is the full form of LASER?
- (f) What is meant by coherence length?
- (g) Name the three components of an optical fibre.
- (h) What is meant by compound semiconductor?
- (i) What is the difference between a semiconductor and a good conductor?
- (j) Write about one application of fibre optics.

Question 2

- (a) Explain the action of a Cockcroft-Walton generator with the help of a circuit diagram. (6)
- (b) Describe the construction of a linear accelerator. (4)

Question 3

- (a) Give the principle and working of a Betatron. (6)
- (b) Write four applications of radio isotopes. (4)

Question 4

- (a) Explain the assignment of Miller indices for a plane. (5)
- (b) Derive Bragg's law. (5)

Question 5

- (a) What is meant by reciprocal lattice? (5)
- (b) In a cubic structure, calculate the spacing between (1 1 1) planes when the lattice parameter is 1.732 \AA . (3)
- (c) If the intercepts are $3a$, $4b$ and $3c$, find the Miller indices of that plane.

Question 6

- (a) Distinguish between Conductor, Semiconductor and Insulator on the basis of band theory. (5)
- (b) Give an idea about Kronig-Penney model. (5)

Question 7

- (a) Give a few properties of superconductors. (4)
- (b) What is Meissner effect? (3)
- (c) Write a few applications of superconductors. (3)

Question 8

- (a) Describe the construction and working of Gas Laser. (6)
- (b) What are the basic characteristics of optical fibers?

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