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Reg. No. :

Code No. : 30309 E Sub. Code : AMPH 63

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2024

Sixth Semester

Physics — Core

SOLID STATE PHYSICS

(For those who joined in July 2020 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Zinc Blende consists of which of the following two elements?
(a) Zinc, Copper (b) Zinc, Oxygen
(c) Zinc, Carbon (d) Zinc, Sulphur
2. Most Bravais lattices are of the type _____.
(a) Primitive unit cell
(b) Body centered unit cell
(c) End centered unit cell
(d) Face centered unit cell

3. Basically, interatomic forces are _____.
(a) electrostatic in nature
(b) gravitational forces
(c) magnetic forces
(d) short-range forces

4. Primary bonds are _____.
(a) ionic bonds
(b) covalent bonds
(c) metallic bonds
(d) all the above

5. The diamagnetism of a substance _____ with temperature.
(a) increases
(b) decreases
(c) remains unchanged
(d) none of these

6. The unit of dielectric constant is _____.
(a) farad/metre (b) unit less
(c) farad-metre (d) farad-metre²

7. The energy required to break a cooper pair is _____ the energy gap of superconductors.

- (a) one half (b) equal to
- (c) twice (d) thrice

8. Below transition temperature, the electric resistance of the superconductor is _____.

- (a) finite (b) large
- (c) zero (d) none

9. The main purpose of CNT's fuel cells is _____.

- (a) production of energy
- (b) active medium
- (c) catalyst
- (d) energy storage

10. Ball milling method is used for _____.

- (a) crushing
- (b) coarse grinding
- (c) fine grinding
- (d) attrition

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Describe the structure of sodium chloride.

Or

(b) Draw simple cubic structure and find the packing factor.

12. (a) Define cohesive energy. Find the cohesive energy of ionic solids.

Or

(b) Compare ionic and covalent solids.

13. (a) Explain dielectric loss.

Or

(b) Explain the theory of paramagnetism.

14. (a) Describe AC and DC Josephson effect.

Or

(b) Explain the occurrence of superconductivity.

15. (a) Explain the preparation of nano particles by chemical vapour deposition method.

Or

- (b) Describe the structure and properties of fullerene.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Define the characteristics of a unit cell. Also calculate the packing factor for FCC.

Or

- (b) Describe the diffraction of X-rays.

17. (a) Describe the different types of bonds in crystals.

Or

- (b) Define Madelung Constant. Evaluate the Madelung constant of NaCl.

18. (a) Describe the domain theory of ferromagnetism.

Or

- (b) Explain the different types of Polarisation.

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19. (a) Describe the general properties of superconductors.

Or

- (b) Explain the BCS theory of superconductivity.

20. (a) Explain the preparation of nano particles by electro deposition method.

Or

- (b) Describe the properties and applications of nano materials.

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