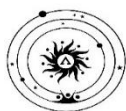


H.T.No: 

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Course Code: 241PH001



# ADITYA UNIVERSITY

B.Tech – I Semester End Examinations Supplementary – Mar 2026

## SOLID STATE PHYSICS (Common to CE, ME, Min.E & PT)

Time: 3 hours

Max. Marks: 100

Answer ONE question from each unit

All Questions Carry Equal Marks

All parts of the questions must be answered at one place only

### UNIT-I

- 1 a Define stress and strain and illustrate the stress–strain curve for a ductile material. L1 CO1 [6M]  
b Explain Hooke's law and derive relation between Young's modulus and bulk modulus. L1 CO1 [14M]

(OR)

- 2 a Analyze the bending moment of a beam subjected to a uniformly distributed load. L4 CO1 [10M]  
b Calculate the depression produced in a loaded cantilever beam. L3 CO1 [10M]

### UNIT-II

- 3 a Explain the terms unit cell, coordination number, and lattice parameters. L2 CO2 [4M]  
b Distinguish between SC, BCC, and FCC structures with neat diagrams. Calculate atomic packing fraction for SC, BCC, and FCC. L2 CO2 [16M]

(OR)

- 4 a Derive Bragg's law for X-ray diffraction. L3 CO2 [6M]  
b Derive expression for interplanar spacing between two successive planes. L3 CO2 [14M]

### UNIT-III

- 5 a Explain the origin of energy bands in crystalline solids with a neat diagram. Classify solids into conductors, semiconductors and insulators. L2 CO3 [16M]  
b Differentiate between intrinsic and extrinsic semiconductors. L2 CO3 [4M]

(OR)

- 6 a Derive expression for Hall co-efficient of a P type semiconductor with explanation of Hall effect. L3 CO3 [14M]  
b Explain drift and diffusion currents in a semiconductor. L4 CO3 [6M]

### UNIT-IV

- 7 a Define magnetic dipole moment, magnetic susceptibility, and permeability. L1 CO4 [6M]  
b Compare diamagnetic, paramagnetic, and ferromagnetic materials. L2 CO4 [14M]

(P.T.O)

**(OR)**

- |   |   |  |    |     |       |
|---|---|--|----|-----|-------|
| 8 | a | Analyze the hysteresis loop of a ferromagnetic material and discuss energy loss.                 | L3 | CO4 | [16M] |
|   | b | A circular coil of 100 turns carries 2 A of current. Calculate the magnetic field at its center. | L3 | CO4 | [4M]  |

**UNIT-V**

- |   |   |  |    |     |       |
|---|---|--|----|-----|-------|
| 9 | a | Explain dielectric polarizability and distinguish between electronic and ionic polarization. | L2 | CO5 | [14M] |
|   | b | State and derive the relation between D, E, and P.   | L2 | CO5 | [6M]  |

**(OR)**

- |    |   |   |    |     |       |
|----|---|---|----|-----|-------|
| 10 | a | Derive expression for internal field produced in a dielectric material. | L3 | CO5 | [14M] |
|    | b | Mention important applications of dielectric materials.                 | L2 | CO5 | [6M]  |

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