

**THE KAVERY ENGINEERING COLLEGE**  
(An Autonomous Institution)

**B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025**

**Second Semester**

**Chemical Engineering**

**PH3258/UPHT24207 / Physics of Materials**

**Regulations -2021/2024**

**Duration: 3 Hrs**

**Maximum: 100 Marks**

**PART – A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)**

| <b>Q.No</b> | <b>Questions</b>                                           | <b>BLT</b> | <b>CO</b> | <b>Marks</b> |
|-------------|------------------------------------------------------------|------------|-----------|--------------|
| 1.          | State the phase rule.                                      | L1         | 1         | 2            |
| 2.          | What is the principle of the sol-gel method?               | L2         | 1         | 2            |
| 3.          | What is the significance of the electron's effective mass? | L2         | 2         | 2            |
| 4.          | State any two properties of superconductors.               | L2         | 2         | 2            |
| 5.          | Define carrier concentration.                              | L1         | 3         | 2            |
| 6.          | What is the Hall coefficient?                              | L1         | 3         | 2            |
| 7.          | Distinguish between soft and hard magnetic materials       | L2         | 4         | 2            |
| 8.          | Define hysteresis.                                         | L1         | 4         | 2            |
| 9.          | Define biomaterials with one example.                      | L1         | 5         | 2            |
| 10.         | What is PMMA used for?                                     | L2         | 5         | 2            |

**PART – B (ANSWER ALL QUESTIONS) (Marks 5\*16 = 80)**

| <b>Q.No</b> | <b>Questions</b>                                                                        | <b>BLT</b> | <b>CO</b> | <b>Marks</b> |
|-------------|-----------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11. a       | Describe the process of physical vapor deposition (PVD) used for thin film preparation. | L1         | 1         | 16           |
|             | <b>Or</b>                                                                               |            |           |              |
| b           | Explain the sol-gel method used in the preparation of materials.                        | L1         | 1         | 16           |
| 12. a       | Derive and explain the expression for electrical conductivity.                          | L3         | 2         | 16           |
|             | <b>Or</b>                                                                               |            |           |              |
| b           | Explain the structure and working of SQUIDS.                                            | L3         | 2         | 16           |
| 13. a       | Compare elemental and compound semiconductors with suitable examples.                   | L2         | 3         | 16           |
|             | <b>Or</b>                                                                               |            |           |              |
| b           | Derive the expression for carrier concentration in n-type and p-type                    | L2         | 3         | 16           |

semiconductors.

|           |   |                                                                                        |    |   |    |
|-----------|---|----------------------------------------------------------------------------------------|----|---|----|
| 14.       | a | Derive the Clausius-Mossotti equation and explain its significance.                    | L3 | 4 | 16 |
| <b>Or</b> |   |                                                                                        |    |   |    |
|           | b | Explain various types of polarization in dielectric materials.                         | L3 | 4 | 16 |
| 15.       | a | Discuss the structure, properties, and applications of graphene.                       | L2 | 5 | 16 |
| <b>Or</b> |   |                                                                                        |    |   |    |
|           | b | Explain the role and functioning of biosensors in medical and industrial applications. | L2 | 5 | 16 |