

Code No.: R25AP102BS

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

I–B.TECH–I–Semester End Examinations (Regular) - December - 2025

ADVANCED ENGINEERING PHYSICS

(Common for ECE, CSM & CSD)

[Time: 3 Hours]

[Max. Marks: 60]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(10 Marks)

1. a) Explain de-Broglie hypothesis in quantum mechanics. [2M]
- b) Explain the classification of solids based on energy gap. [2M]
- c) Define quantum entanglement. [2M]
- d) Discuss the Weiss domain theory of ferromagnetism. [2M]
- e) Explain stimulated emission and its role in producing coherent radiation. [2M]

PART-B

(50 Marks)

2. Explain the postulates of quantum mechanics and discuss their importance in describing microscopic systems. [10M]

OR

3. Explain the Kronig–Penney model qualitatively. [10M]
4. Explain the construction, working, and V–I characteristics of a P–N junction diode under forward and reverse bias. [10M]

OR

5. Explain the working principle of Scanning Electron Microscope (SEM) with block diagram. [10M]
- 6.a) Explain Dirac's bra and ket notation and write important properties of bra and ket vectors. [6M]
- b) Explain the CNOT gate and its importance in quantum circuits. [4M]

OR

7. Explain Hadamard, Pauli-X, Pauli-Y, and Pauli-Z gates with truth tables. [10M]
8. Explain the hysteresis loop and discuss soft and hard magnetic materials based on hysteresis loop. [10M]

OR

9. Explain ferroelectric materials in detail. Describe ferroelectric hysteresis loop and discuss applications such as Fe-RAM and fire sensors. [10M]

- 10.a) Explain Einstein coefficients and derive the relation between them. [8M]
- b) What are the characteristics of Laser? [2M]

OR

11. Explain the classification of optical fibres based on material, modes of propagation, and refractive index profile. [10M]
