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KAMALA INSTITUTE OF TECHNOLOGY & SCIENCE, SINGAPUR

25PH28BS102

I.B. Tech. I. Semester Regular Examinations, Dec-2025/Jan- 2026

ADVANCED ENGINEERING PHYSICS

(Common to CE, EEE, ME, ECE & AIML)

Time: 3 Hours

Max. Marks: 60

Note: Question paper consists of Part-A & Part-B.

i) **Part-A** for 10M, ii) **Part-B** for 50marks

- **Part A** is compulsory, consists of 5 sub questions from all units carrying equal marks.
- **Part-B** consists of **10 questions** (numbered from 2 to 11) carrying **10marks** each. From each unit there are 2 questions and the students should answer one of them. Hence the student should answer **5 questions** from **Part-B**.

PART-A (10Marks)			
Q. No	Questions	Marks	BTL
1.a)	Explain the terms space lattice and unit cell	2M	1
1.b)	Explain the Heisenberg Uncertainty Principle.	2M	2
1.c)	Write any two differences between classical bits and a qubit.	2M	2
1.d)	Write the types of dielectric polarizations.	2M	1
1.e)	Differentiate between spontaneous and stimulated emission of radiation	2M	2
PART-B(50Marks)			
Q.No	Questions	Marks	BTL
2. a)	Explain the significance of the surface-to-volume ratio in nano materials.	3M	2
b)	Explain the working of the Scanning Electron Microscope with help of a block diagram.	7M	3

OR			
3. a)	Show that the FCC unit cell is the most closely packed among the SC, BCC, and FCC unit cells.	6M	3
b)	Derive the relation for the inter-planar distance of a cubic crystal.	4M	3
OR			
4. a)	Explain the significance of the wave function.	3M	2
b)	Derive an expression for the eigen energy of a particle in a 1-D potential box.	7M	3
OR			
5. a)	Explain the classification of solids based on energy bands.	5M	2
b)	Explain the concept of the effective mass of an electron	5M	3
OR			
6. a)	Explain the challenges and advantages of quantum computing over classical computation.	5M	3
b)	Explain Dirac's Bra-Ket notation.	5M	3
OR			
7. a)	Discuss the role of Hilbert space in quantum computation.	3M	3
b)	Explain how Bloch's sphere is used to represent the state of a qubit.	7M	3
OR			
8. a)	Explain the classification of magnetic materials.	7M	3
b)	A material has a magnetic flux density of 0.002 T when subjected to a magnetic field strength of 200 A/m. Calculate the permeability of the material.	3M	2
OR			
9. a)	Explain the hysteresis behavior in ferromagnetic materials.	6M	2
b)	Differentiate between the soft and hard magnetic materials.	4M	2
OR			
10.a)	Explain Einstein's coefficients and establish their relations.	5M	3

b)	Explain the construction and working of the He-Ne laser with necessary energy level diagrams.	5M	3
OR			
11.a)	Derive an expression for the acceptance angle for an optical fiber. How it is related to numerical aperture?	6M	3
b)	Differentiate between step and graded index optical fibers.	4M	2

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