

Code No: 9HC07

Date: 01-Sept-2023 (FN)

B.Tech I-Year II- Semester External Examination, Aug/Sept-2023 (Regular)
ENGINEERING PHYSICS (CSE, IT DS, CS, AIML and IOT)

Time: 3 Hours

Max.Marks:60

Note: a) No additional answer sheets will be provided.
b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.
c) Missing data can be assumed suitably.

Bloom's Cognitive Levels of Learning (BCLL)

Remember	L1	Apply	L3	Evaluate	L5
Understand	L2	Analyze	L4	Create	L6

Part - A

Max.Marks: 6x2=12

ANSWER ALL QUESTIONS, EACH QUESTION CARRIES 2 MARKS.

	BCLL	CO(s)	Marks
1 Determine the ratio of de Broglie's wavelengths of electron and proton moving with same velocities? (Given the mass of an electron is 9×10^{-31} kg while the mass of a proton is 1.7×10^{-27} kg for mathematical convenient sake).	L5	CO1	[2M]
2 Classify the optical fibers based on the refractive index profile.	L2	CO2	[2M]
3 Show that superconductors are perfect diamagnetic.	L4	CO3	[2M]
4 What do you understand by electronic and ionic polarizability?	L2	CO4	[2M]
5 What are Fermi levels in intrinsic and extrinsic semiconductors?	L2	CO5	[2M]
6 Why do nanomaterials exhibit different properties than bulk materials?	L4	CO6	[2M]

Part – B

Max.Marks: 6x8=48

ANSWER ALL QUESTIONS. EACH QUESTION CARRIES 8 MARKS.

	BCLL	CO(s)	Marks
7. a) i) What are the matter waves? Explain the G.P. Thomson experiment to prove the existence of matter waves. ii) State the physical significance of wave function.	L2	CO1	[6+2]
OR	L3		
b) i) Write Schroedinger wave equation for a particle in a box. ii) Solve it to obtain Eigen functions and show that the Eigen values are discrete.	L2	CO1	[8M]
	L3		
8. a) i) Distinguish between step index and graded index optical fibers ii) Obtain an expression for acceptance angle of an optical fiber.	L2	CO2	[8M]
OR	L2		
b) i) How is stimulated emission different from spontaneous emission? ii) Describe the construction and working of semiconductor laser.	L2	CO2	[8M]
	L2		
9. a) Explain the B-H curve based on domain theory.	L2	CO3	[8M]
OR			
b) i) State and explain Meissner effect. ii) Describe magnetic levitation phenomenon.	L2	CO3	[8M]
	L2		

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| 10. | a) | i) State and explain the relation between dielectric constant and electric susceptibility. | L3 | CO4 | [8M] |
| | | ii) What are electronic, ionic, and orientation polarizations? | L2 | | |
| | | OR | | | |
| | b) | i) Obtain Clausius-Mossotti equation. | L2 | CO4 | [8M] |
| | | ii) Explain frequency and temperature effect on dielectrics. | L3 | | |
| 11. | a) | i) Distinguish between direct and indirect band gap semiconductors. | L2 | CO5 | [8M] |
| | | ii) Explain the Hall effect in semiconductors. | L2 | | |
| | | OR | | | |
| | b) | Explain the working of PN junction diode and state the V-I characteristics of it. | L2 | CO5 | [8M] |
| 12. | a) | Describe synthesis of nanomaterials using Sol-gel method and chemical vapour deposition technique. | L2 | CO6 | [8M] |
| | | OR | | | |
| | b) | i) What is quantum confinement effect? | L2 | CO6 | [8M] |
| | | ii) State and explain nanomaterial characterization techniques. | L2 | | |

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