BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-I Computer Science & Engineering AI & ML : WINTER: 2025
SUBJECT: PHYSICS FOR COMPUTING SYSTEMS

Day : Wednesday
Date : 10/12/2025

W-27615-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagrams **wherever** necessary.
4) Use of non - programmable **calculator** is allowed.
5) Assume suitable data if **necessary.**

Q.1 a) Explain electrostatic focusing and magneto static focusing, with neat label diagram. (06)

b) Explain motion of electron in transverse magnetic field. (04)

OR

a) Explain construction and working of scanning electron microscope. (SEM) with neat diagram. (06)

b) Calculate velocity of proton accelerated through potential difference of 30 KV. Mass of proton = 1.66×10^{-27}kg. (04)

Q.2 a) What is polarization? Explain principle and working of Nicol prism. (06)

b) White light falls normally on a soap film of thickness 0.45 micrometer and Refractive index 1.27 which wavelength in the visible region will be reflected most strongly. (04)

OR

a) With suitable diagram explain formation of Newton's Ring in reflected light. Prove that the diameter of the n^{th} dark Ring is proportional to the square Root of natural number. (06)

b) A plane transmitting grating having 6000 lines per centimeter. Gives an angle of diffraction of a 30^0 in 1^{st} order find the wavelength of the line. (04)

Q.3 a) With neat energy level diagram explain the construction and working of H_e-N_e laser. (06)

b) Explain metastable state and stimulated emission. Explain population inversion. (04)

OR

a) With neat labeled diagram explain construction and working of Co_2 laser (06)

b) Write properties and application of laser. (04)

Q.4 a) Draw a suitable diagram and derive an expression for numerical aperture of a step index fiber. (06)

b) Calculate the numerical aperture and acceptance angle of optical fiber of refractive index of core and cladding is 1.58 and 1.49. (04)

OR

a) Explain types of optical fiber. Distinguish between step index and graded index fibre. (06)

b) If refractive index of core is 1.57 and fractional refractive index difference is 0.002. Find refractive index of cladding and numerical aperture. (04)

P.T.O.

Q.5	a)	Derive Schrodinger time dependent wave equation in one dimension	(06)
	b)	Calculate the energy of neutron in eV whose de Broglie wavelength is 0.12 A^0.	(04)
		OR	
	a)	Write physical significance of wave function .write properties of matter waves ,prove electron cannot pre exit in free state of nucleus	(06)
	b)	State and explain Heisenberg uncertainty principle	(04)
Q.6	a)	What is Hall effect .state its significance .How can mobility be determined by using Hall effect.	(06)
	b)	Write application of Hall effect.	(04)
		OR	
	a)	Explain Fermi level in intrinsic semiconductor.	(06)
	b)	What is Fermi energy and Fermi –Dirac distribution function?	(04)

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