BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - I COMPUTER SCIENCE & ENGINEERING-A&M : SUMMER : 2024
SUBJECT: PHYSICS FOR COMPUTING SYSTEMS

Day : Thursday
Date : 09/05/2024

S-23924-2024

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 construction and working of transmitting electron microscope. (TEM) with neat diagram.	**(06)**
	b)	Draw a block diagram of CRT. Explain motion of electron in cross field.	**(04)**
		OR	
	a)	Explain electrostatic focusing and magneto static focusing, with neat label diagram.	**(06)**
	b)	Calculate velocity of proton accelerated through potential difference of 25 KV. Mass of proton = 1.66×10^{-27}kg.	**(04)**
Q.2	**a)**	Explain single slit diffraction and write condition for secondary maxima and minima.	**(06)**
	b)	A plane transmitting grating having 5000 lines per centimeter. Gives an angle of diffraction of a 30^0 in 1^{st} order find the wavelength of the line.	**(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)	What is polarization? Explain principle and working of Nicol prism.	**(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 Ruby 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 1.55 and 1.46.	**(04)**
		OR	
	a)	Give the name of different types of fibre. Describe schematically the basic element of optical fibre communication system.	**(06)**
	b)	A light ray entering optical fibre kept in water (R.I. = 1.33) of core refractive index 1.485 and cladding (R.I= 1.43) find acceptance angle and numerical aperture.	**(04)**

P.T.O.

Q.5 a) Derive Schrodinger time dependent wave equation in one dimension (06)

b) Find de-Broglie wavelength for electron accelerated by potential 220 V. (04)

OR

a) State Heisenberg's uncertainty principle. Prove the electron cannot pre-exist in free state in nucleus. (06)

b) What is a wavelength of beam of neutron's having energy of 0.024 eV and mass 1.6768×10^{-27} kg. (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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