BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - II CS&E :SUMMER- 2022
SUBJECT : PHYSICS FOR COMPUTING SYSTEMS

Day : Monday   Time : 10:00 AM-01:00 PM
Date : 1/8/2022   **S-24026-2022**   Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Net diagrams must be drawn **WHEREVER** necessary.
4) Use of non-programmable **CALCULATOR** is allowed.
5) Assume suitable data **WHEREVER** necessary.

Constants:
$e = 1.6 \times 10^{-19} C$
$m_e = 9.1 \times 10^{-31}$ kg
$h = 6.63 \times 10^{-34}$ J-s
$m_p = 1.66 \times 10^{-27}$ kg
$N_a = 6.025 \times 10^{23}$ atom/gm-mole

Q.1	Give the principle construction and working of Bainbridge mass spectrograph. Prove that the radius of orbit is proportional to the mass of Isotopes.	**(10)**
	OR	
	Explain the mechanism of electron focusing using an electrostatic lens. Calculate the energy and wavelength for an electron acceleration by voltage 200kv.	**(10)**
Q.2	What is diffraction? Differentiate between Fraunhofer's and Fresnel's diffraction.	**(10)**
	OR	
	Explain the phenomenon of double refraction. Explain it on the basis of Huygen's theory.	**(10)**
Q.3	With energy level diagram explain the construction and working of CO_2 laser.	**(10)**
	OR	
	Discuss i) Einstein's A and B coefficients ii) Spontaneous and stimulated emission	**(10)**
Q.4	Explain the propagation of light in optical fiber. Derive the formula for numerical aperture.	**(10)**
	OR	
	Classify the optical fiber on the basis of, a) mode of propagation b) refractive index grading	**(10)**
Q.5	Derive the formula for energy for an electron trapped in potential well of infinite depth. If the width of potential well is $2A^0$ calculate $\Delta E = E_2 - E_1$ in eV.	**(10)**
	OR	
	What is deal nature of matter? Derive the formula for De-Broglie's wavelength.	**(10)**
Q.6	Derive the formula for conductivity in semiconductors. Calculate the conductivity of silicon if the donor atoms added are 1 per 10^8 silicon atoms. (Given: $n_i = 1.6 \times 10^{10}$ /cm^3 and $\mu_e = 1500$ cm^2 /V - sec.)	**(10)**
	OR	
	Explain the working of diode on the basis of band theory.	**(10)**

****