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

Day : Thursday
Date : 28-07-2022

S-24012-2022

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) Use of non-programmable **CALCULATOR** is allowed.
4) Draw neat and labeled diagram **WHEREVER** necessary.
5) Assume suitable data if 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
$m_p = 1.67 \times 10^{-27}$ kg
$N_a = 6.025 \times 10^{23}$ atoms /gm - mole

Q.1 Explain principle, construction and working of scanning electron microscope. **[10]**

OR

Q.1 Write a short note on Cathode Ray Tube (CRT). **[10]**
An electron of kinetic energy 75eV revolve in a transverse magnetic field of strength 10^{-9} weber/cm^2. Calculate the radius of circular path and period of motion.

Q.2 What is interference? Explain any two applications of interference. **[10]**
A slit is illuminated by a monochromatic light of wavelength 5890Å. Calculate the half angular width of central maxima if width of slit is 1 μm.

OR

Q.2 Explain construction and working of Nicol prism. A monochromatic wavelength of 6200 Å incident normally on a diffraction grating 1 inch wide. Calculate number of lines/cm of grating, if first order spectrum is observed at 18^0 from normal. **[10]**

Q.3 Explain principle, construction and working of CO_2 LASER. **[10]**

OR

Q.3 State and explain Einstein's coefficient. Derive an expression for Einstein's coefficient of absorption and emission. **[10]**

Q.4 State and explain monomode fibre and multimode fibre. **[10]**

OR

Q.4 Explain any five advantages of optic fibre communication system. **[10]**

Q.5 What do you mean by matter waves? State De-Broglie's hypothesis and derive the derivation for De-Broglie's wave length. **[10]**

OR

Q.5 What are the physical significance of wave function 'ψ'? **[10]**
Calculate the kinetic energy of moving electron, if wavelength associated with it is 5800Å.

Q.6 Write a note on : **a)** Density of states **b)** Effective mass of electron **[10]**

OR

Q.6 State and explain p-n junction diode under forward bias. (Draw energy band diagram). **[10]**
A potential difference of 6.5 volt is applied across a semiconductor sample of area of cross-section 1.5cm^2 and thickness 0.2 mm. Calculate the current produced in the semiconductor.
($n_i = 10^{19}/m^3$, $\mu_h = 0.2$ m^2/V-s, $\mu_e = 0.4$ m^2/V-s)

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