BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

Computer Science & Engineering

B. Tech. Sem - II :SUMMER : 2023

SUBJECT : PHYSICS FOR COMPUTING SYSTEMS

Day : Wednesday | Time : 10:00 AM-01:00 PM

Date : 24-05-2023 | S-24026-2023 | 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** Explain the motion of on electron in the parallel and extensive perpendicular magnetic field. **(10)**
If an electron is accelerated by voltage 100 kV and then subjected to extensive magnetic field of 2T, calculate the radius of orbit in the field.

**OR**

Give the principle construction and working of scanning electron microscope. **(10)**

**Q.2** What is plane polarized light? Give the principle, construction and mechanism for obtaining plane polarized light using a Nicol prism. **(10)**

**OR**

What are thin film? Explain the interference in thin films. **(10)**
If sunlight falls normally on an oil film having thickness $60000A^0$, which wavelengths will be reflected most strongly? (Gren: $\mu = 1.33$)

**Q.3** With energy level diagram explain the construction and working of Ruby laser .Why it is purled laser? **(10)**

**OR**

Define the following terms: **(10)**
a) Stimulated emission b) Population inversion c) Metastable state

**Q.4** Explain the propagation of light in optical fiber. Define the following terms: a) Critical angle b) Angle of acceptance **(10)**

**OR**

Explain the optical fibre communication system. **(10)**

**Q.5** State and explain De Broglie's hypothesis. **(10)**
Calculate the De-Broglie's wavelength for, i) electron with velocity $2 \times 10^7$ m/s and ii) Car with mass 1 ton and velocity 120 km/hr.

**OR**

Derive Schrodinger's time dependent wave equation. **(10)**

**Q.6** State and explain the Hall effect. Derive the formula for Hall voltage. **(10)**
Calculate the mobility of charge carriers, if conductivity is 100 per $\Omega$ - m and $R_H = 3.6 \times 10^{-4}$ $m^3$ / coulomb.

**OR**

What is energy band? Explain the formation of energy bands in solids. **(10)**

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