

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II INFORMATION TECHNOLOGY : SUMMER : 2024
SUBJECT: ENGINEERING PHYSICS

Day : Friday
Date : 24/05/2024

S-27743-2024

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) Assume suitable data **WHEREVER** necessary.
- 4) Draw neat diagrams **WHEREVER** necessary.

Given

Mass of electron (m_e) = 9.1×10^{-31} kg
Charge on electron (e) = 1.6×10^{-19} C
Planck's constant (h) = 6.625×10^{-34} J-s
Mass of proton (m_p) = 1.67×10^{-23} kg.

- Q.1** Derive an expression for the displacement of an electron, due to magnetic field (10)
(limited) perpendicular to the electron entering the field.
An electron describes a helix of radius 6cm and pitch of 2cm in a magnetic field of 0.023 tesla. Calculate the component of velocity perpendicular to the magnetic field.
- OR**
- Q.1** Explain principal, construction and working of transmission electron microscope. (10)
- Q.2** Explain the principle behind the Magnetostriction Oscillator. Discuss construction (10)
and working of magnetostriction oscillator.
- OR**
- Q.2** What are the basic requirements for acoustically good hall (Explain any four). (10)
Calculate the sound intensity produced by a sound source of 80 decibel.
(Given: $I_0=10^{-12}$ watt/m²)
- Q.3** Derive Schrodinger's time independent wave equation in three dimension. (10)
- OR**
- Q.3** What are matter waves? Explain any three properties of matter waves. (10)
Calculate the De Broglie's wavelength associated with an electron of energy 35 J.
- Q.4** What is diffraction? Explain Fraunhofer diffraction in detail. (10)
A monochromatic beam of light diffracts from plane diffraction grating having 5500 lines per cm. Calculate wavelength of incident light if second maxima is observed at 25° from central maxima.
- OR**
- Q.4** Explain interference due to uniform thickness thin film. Derive the derivation for (10)
conditions of constructive and destructive interference for reflection region.
- Q.5** What is stimulated emission? With the help of energy level diagram explain (10)
construction and working of semiconductor laser.
- OR**
- Q.5** Explain principle and construction of Nicol prism. Discuss Nicol prism as a (10)
polarizer.
- Q.6** What do you mean by nanotechnology? Explain any three properties of (10)
nanoparticles.
- OR**
- Q.6** With the help of energy band structure. Explain effect of temperature and doping on (10)
position of Fermi energy level.

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