

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II INFORMATION TECHNOLOGY : SUMMER : 2025
SUBJECT: ENGINEERING PHYSICS

Day : Monday
Date : 26/05/2025

S-27743-2025

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 Explain motion of an electron in perpendicular electric field. Derive derivation for displacement due to electric field. (10)
- OR**
- Q.1 Explain construction of cathode Ray Tube (CRT). (10)
An electron at rest enters in a parallel electric field of 10^4 V/cm. Determine velocity after 5 ms.
- Q.2 Write a note on: i) Sabine's formula ii) Sound absorption (10)
A loud speakers emits a sound of 3×10^{-7} watt/cm². Find the sound intensity level of the speaker. (Given: $I_0 = 10^{-16}$ watt/cm²)
- OR**
- Q.2 Explain construction and working magnetostrictive oscillator for production of ultrasonic waves. (10)
- Q.3 Derive the derivation for energy of an electron in a rigid box. (10)
- OR**
- Q.3 State and explain: (10)
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|------------------|---------------------|
| i) Wave packets | iii) Phase velocity |
| ii) Matter waves | iv) Group velocity |
- Q.4 With a neat labelled diagram explain diffraction due to single slit. (10)
An oil film of refractive index 1.3 is illuminated by a wavelength of 5700 \AA . Calculate thickness of film if 5th dark band is observed when viewed at angle of 30° from normal.
- OR**
- Q.4 Discuss interference due to non-uniform thin film. Derive the derivation for conditions of constructive and destructive interference. (10)
- Q.5 Explain: (10)
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| i) Any five characteristics of laser. | |
| ii) Distinguish between E-ray and O-ray. | |
- OR**
- Q.5 Explain principle, construction and working of Nd-YAG laser with the help of energy level diagram. (10)
- Q.6 Explain: (10)
- | | |
|---|--|
| i) Energy bands in solids. | |
| ii) Fermi energy level in extrinsic semiconductors. | |
- OR**
- Q.6 What is nanoparticle? Explain electrical and magnetic properties of nanoparticles. (10)

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