BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-I Computer Science & Business Systems : SUMMER : 2025
SUBJECT: PHYSICS FOR COMPUTING SCIENCE

Day : Monday
Date : 19/05/2025

S-27625-2025

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 labelled diagrams **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 What is resonance? Prove that the resonance happens when the natural frequency of object and force frequency is same. What are the factors which decide the sharpness of resonance? **[10]**

OR

Q.1 Establish the differential equation for LCR circuit with an external a.c. supply. Derive the frequency of oscillation. **[10]**

Q.2 Obtain the conditions for maxima and minima in Fraunhofer diffraction due to a single slit. **[10]**
What is the highest order spectrum which can be seen with monochromatic light of wavelength 6000 A° by means of a diffraction grating with 5000 lines/cm?

OR

Q.2 Explain the phenomenon of double refraction in calcite on the basis of Huygen's theory. **[10]**

Q.3 State and explain the Heisenberg's uncertainty principle. **[10]**
If uncertainty in the position is equal to it's de-Broglie's wavelength, prove that the uncertainty in velocity is equal to it's velocity.

OR

Q.3 Derive Schroedinger's time dependent wave equation. **[10]**

Q.4 What is packing factor? Show that the packing factor for BCC is $\sqrt{3}\frac{\pi}{8}$. **[10]**

OR

Q.4 Explain the concept of X-ray diffraction at a crystal. How it is used to determine the crystal structure? **[10]**

Q.5 Explain principle, construction and working of Ruby Laser. **[10]**

OR

Q.5 What is population inversion? Define Einstein's A and B coefficients and derive relation between them. **[10]**

Q.6 What is entropy? Discuss entropy is a reversible and irreversible process. **[10]**

OR

Q.6 State and explain the significance of Maxwell's equation in differential and integral form. **[10]**

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