

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - I Computer Science & Business Systems : SUMMER : 2025
SUBJECT: PHYSICS FOR COMPUTING SCIENCE

Day : Monday
Date : 19/05/2025

S-24134-2025

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) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Use of non-programmable **CALCULATOR** is allowed.
- 5) Assume suitable data if necessary.

Constants:

$$e = 1.6 \times 10^{-19} \text{C}$$

$$m_e = 9.1 \times 10^{-31} \text{kg}$$

$$h = 6.63 \times 10^{-34} \text{J-s}$$

$$m_p = 1.67 \times 10^{-27} \text{kg}$$

$$N_a = 6.025 \times 10^{23} \text{ atoms/gm - mole}$$

Q.1 What is forced oscillation? Derive the formula for amplitude for forced oscillation. [10]

OR

Q.1 Explain the oscillation in LCR. Derive the formula for resonance frequency. [10]

Q.2 What is double refraction? Give the Hygen's theory of double refraction. [10]

OR

Q.2 Explain diffraction at a single slit. Derive the formula for minima in case of single slit diffraction. [10]

Q.3 Derive the formula for energy eigen value for an electron trapped in a potential well of infinite depth. Calculate the first two energy levels if the width of potential well is 5 nm. [10]

OR

Q.3 State and explain the De-Bronglie's hypothesis. If the uncertainty in position is equal to its De-Brogile wave length, prove that uncertainty in velocity is equal to its velocity. [10]

Q.4 What is Miller indices? Draw the Miller plane for the Miller indices given by: [10]
i) (1 0 1) ii) (2 0 1) iii) (3 0 1)

OR

Q.4 Derive the formula for interplanar spacing in simple cubic structure. Calculate the interplanar spacing for (3 2 1) plane in simple cubic, if $a = 4.2 \times 10^{-10} \text{ m}$. [10]

Q.5 With energy level diagram explain the working of CO₂ laser. [10]

OR

Q.5 Explain the mechanism of light propagation in optical fibre. What are different types of optical fibres? [10]

Q.6 What is entropy? Prove that entropy in irreversible process is positive. [10]

OR

Q.6 What is Carnot engine? Explain the steps and draw the Carnot cycle. [10]

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