

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

Day : Thursday
Date : 18/12/2025

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

Constants:

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

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

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

$$m_p = 1.66 \times 10^{-27} \text{kg}$$

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

Q. 1 What is forced oscillation? Derive the formula for resonance frequency. (10)

OR

Q. 1 Form the differential equation when inductor, capacitor and resistor are connected in series. State the formula for oscillation. (10)

Q. 2 What is double refraction? Explain it on the basis of Huygens's theory of double refraction. (10)

OR

Q. 2 In Newton's rings, prove that diameter of a dark ring is proportional to the square root of an integer. (10)
When Newton's rings are formed with light of wavelength 7800 \AA , diameter of 10^{th} dark ring is 0.39 mm. Calculate the radius of curvature of lens.

Q. 3 Derive Schrodinger's time dependent wave equation. (10)

OR

Q. 3 What is signification of ψ and $|\psi|^2$? (10)

Q. 4 What is Miller indices? Draw the planes corresponding to Miller indices (10)
i) (100) ii) (111)

OR

Q. 4 Explain the phenomenon of diffraction of X-rays through crystals. Derive the Bragg's Law. (10)

Q. 5 Explain the principle of light propagation in optical fiber. Derive the formula for numerical aperture. (10)

OR

Q. 5 What are Einstein's A and B coefficient? Derive relation between them. (10)

Q. 6 What is thermodynamics? State 0^{th} and 1^{st} law of thermodynamics. (10)

OR

Q. 6 Give Maxwell's equation in differential and integral form. (10)
