BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - II Computer Science & Engineering : WINTER : 2024
SUBJECT: PHYSICS FOR COMPUTING SYSTEMS

Day : Saturday
Date : 07/12/2024

W-24026-2024

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) Draw neat and labelled diagrams **WHEREVER** necessary.
4) Use of non-programmable calculator is **ALLOWED**.
5) Assume suitable data, if necessary.

Constants :

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

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

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

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

$Na = 6.025 \times 10^{23}$ *atoms / gm − mole*

Q. 1 With labelled diagram, explain various parts and working of Cathode Ray Tube (CRT). **(10)**

OR

Obtain an expression for vertical displacement of charged particle in perpendicular electric field and calculate velocity attained by charged particle and its kinetic energy when it is accelerated through a potential difference of 100 volts. The charged particle has mass 10 times the mass that of electron and charge equal to the electron. **(10)**

Q. 2 Discuss the following applications of interference: **(10)**

i) Testing of surface flatness

ii) Non-reflecting coatings

OR

Distinguish between two classes of diffraction and calculate angular position of first minimum in Fraunhofer diffraction pattern of a slit of width 10^{-5} cm when it is illuminated by a light of wavelength $5555A^0$. **(10)**

Q. 3 What does the acronym LASER stand for? Discuss the terms spontaneous emission and stimulated emission and population insertion in LASER. **(10)**

OR

Explain characteristics properties of laser and any five applications of laser in various fields. **(10)**

P. T. O.

Q. 4 With block diagram explain working of optical fibre communication system and calculate refractive index of clad material if the refractive index for core is 1.41 and angle of acceptance is 30° for the optical fibre. **(10)**

OR

Discuss the types of optical fibre based on refractive index, modes of propagation and material used. **(10)**

Q. 5 Derive Schrodinger's time dependent wave equation and write a note on tunnelling in quantum mechanics. **(10)**

OR

Derive Schrodinger's time independent wave equation and write a note on matter waves. **(10)**

Q. 6 Discuss Fermi Dirac probability function and prove that Fermi-level lies at the middle of forbidden band for an intrinsic semiconductor. **(10)**

OR

Discuss the band structure and working of p-n junction diode under forward and reverse biasing. **(10)**

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