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R13

B.Tech I Year (R13) Regular Examinations June/July 2014

ENGINEERING PHYSICS

(Common to all branches)

Max. Marks: 70

Time: 3 hours

(b)

PART - A

(Compulsory Question)

- 1 Answer the following: $(10 \times 02 = 20 \text{ Marks})$
 - (a) Write the conditions for constructive and destructive interference in the reflected light.
 - (b) What are the different pumping methods in lasers?
 - (c) What is meant by attenuation in optical fibers?
 - (d) What is Frenkel defect?
 - (e) What is meant by non-destructive testing?
 - (f) What are matter waves?
 - (g) Write the relation between conductivity and mobility.
 - (h) What is Fermi level?
 - (i) What is Bohr magnetron?
 - (j) What is penetration depth?

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

- 2 (a) Explain Fraunhofer diffraction due to single slit.
 - (b) The light of wavelength 5500 A^0 falls normally on a slit of width 22×10^{-5} cm. Calculate the angular position of the first two minima on either side of central maxima.

OR

- 3 (a) Explain the characteristics of lasers.
 - (b) Differentiate step index and graded index fibers.

UNIT - II

- 4 Show that FCC is more closely packed than BCC and SC. OR
- 5 What are ultrasonics? With necessary circuit diagram, explain the production of ultrasonics using piezoelectric effect.

UNIT - III

- 6 (a) Derive Schrodinger's time independent wave equation.
 - Explain the physical significance of ψ .

OR

7 What are the salient features of classical free electron theory? Also mention its drawbacks.

UNIT - IV

- 8 (a) Derive Einstein's relations in semiconductors.
 - (b) Explain the working of a p-n junction with energy band diagram.

OR

- 9 (a) State and explain hysteresis.
 (b) The magnetic susceptibility of silicon is -0.4 × 10⁻⁵. Calculate the flux density and magnetic
 - moment per unit volume when magnetic field of intensity 5×10^5 A/m is applied.

UNIT - V

- 10 (a) State and explain Meissner effect.
 - (b) Explain type-I and type-II superconductors.

OR

(a) Explain the basic principles in nanomaterials.(b) Write applications of carbon nano tubes.

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