

**Code: 13A56101**

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

ENGINEERING PHYSICS

(Common to all branches)

Time: 3 hours

Max. Marks: 70

PART - A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Write the conditions for constructive and destructive interference in the reflected light.
 - What are the different pumping methods in lasers?
 - What is meant by attenuation in optical fibers?
 - What is Frenkel defect?
 - What is meant by non-destructive testing?
 - What are matter waves?
 - Write the relation between conductivity and mobility.
 - What is Fermi level?
 - What is Bohr magneton?
 - 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 \AA falls normally on a slit of width $22 \times 10^{-5} \text{ cm}$. 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.
(b) 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 $5 \times 10^5 \text{ A/m}$ is applied.

UNIT - V

- 10 (a) State and explain Meissner effect.
(b) Explain type-I and type-II superconductors.
- OR
- 11 (a) Explain the basic principles in nanomaterials.
(b) Write applications of carbon nano tubes.

