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B.Tech I Year I Semester (R15) Supplementary Examinations November/December 2019 ENGINEERING PHYSICS

(Common to CE, EEE & CSE)

Time: 3 hours

1

Max. Marks: 70

PART – A

(Compulsory Question)

- Answer the following: $(10 \times 02 = 20 \text{ Marks})$
 - (a) What are the conditions to get interference?(b) Explain the principle of an optical fiber.
 - (b) Explain the principle(c) Define unit cell.
 - (d) What is piezoelectric effect?
 - (e) What is a matter wave?
 - (f) How do you define Fermi energy?
 - (g) Define intrinsic semiconductor.
 - (h) What is hysteresis?
 - (i) Mention the properties of superconductors.
 - (j) What is nanoscale and nanometer?

PART – B

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

UNIT – I

- 2 (a) Describe Fraunhofer diffraction due to single slit.
 - (b) In Newton's rings experiment, the diameters of the 4th and 25th rings are 0.3 cm and 0.8 cm, respectively. Find the wavelength of light. Given R = 100 cm.

OR

- 3 (a) What is interference? Obtain an expression for the path difference in case of interference in thin films due to reflected light.
 - (b) Write any four important applications of lasers in medicine.

- 4 (a) Deduce packing factors for simple cubic and bcc structures.
 - (b) Define ultrasonic waves. Explain the use of ultrasonic waves in non-destructive testing.

OR

- 5 (a) Sketch the following planes in cubic unit cell (010) (110) (111).
 - (b) Discuss the use of ultrasonics for flaw detection.

UNIT – III

- 6 (a) An electron is confined to a one-dimensional potential box of 2Å length. Calculate the energies corresponding to the second and fourth quantum states in eV.
 - (b) What are the salient features of quantum free electron theory? Mention its drawbacks.

OR

- 7 (a) Explain the difference between a matter wave and an electromagnetic wave.
 - (b) Discuss the origin of electrical resistance in metals.

UNIT – IV

- 8 (a) How do you distinguish between intrinsic and extrinsic semiconductors giving suitable examples?
 - (b) What are the differences between hard and soft magnetic materials?

OR

- 9 (a) Explain law of mass action in a semiconductor.
 - (b) Draw and explain hysteresis curve for a ferromagnetic material placed in a magnetic field.

(UNIT – V)

10 (a) What are cooper pairs? Explain.

- (b) Describe the synthesis of nanomaterials by ball milling method.
- 11 (a) Describe the BCS theory of superconductivity.
 - (b) Explain the applications of nanomater fairst Rankes toots.