Code: 15A56101 **R15**

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

ENGINEERING PHYSICS

(Common to CE, EEE & CSE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)
- (a) What are the conditions to get interference?
- (b) Explain the principle of an optical fiber.
- (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.

UNIT – II

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.

OR

11 (a) Describe the BCS theory of superconductivity.
(b) Explain the applications of nanomaterials in various fields.

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