

Code: 15A56101

B.Tech I Year II Semester (R15) Supplementary Examinations December 2018

ENGINEERING PHYSICS

(Common to IT, ECE, EIE and ME)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Describe coherent and non-coherent sources.
 - (b) The refractive indices of core and cladding for a step index fibre are 1.62 and 1.52 respectively. Find the numerical aperture and acceptance angle.
 - (c) What is Bragg's law?
 - (d) What do you mean by non-destructive testing?
 - (e) Calculate the de-Broglie wavelength of an electron of energy 200eV.
 - (f) What is mobility? How mobility is related to conductivity?
 - (g) Explain Hall effect and give two applications.
 - (h) What is Bohr magneton? Explain.
 - (i) Explain the importance of critical magnetic field in superconductors.
 - (j) Write short note on quantum confinement.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

- 2 (a) Explain the formation of Newton's rings and show that the radii of dark rings are proportional to, under root of natural numbers.
- (b) The radii of n^{th} and $(n+5)^{\text{th}}$ dark rings are found to be 6 mm and 8 mm respectively in Newton's rings experiment. Calculate the wavelength of light used, if the radius of curvature of the curved surface is 10 meters.

OR

- 3 (a) Describe the terms: (i) Optical pumping. (ii) Metastable state. (iii) Population inversion.
- (b) Discuss with suitable diagrams, the principle, construction and working of He-Ne laser.

UNIT – II

- 4 (a) Determine miller indices for a plane making 2a, 4b, 3c intercepts on the crystallographic axes.
- (b) Show that FCC has got maximum packing fraction by working out the packing fractions of all three cubic structures.

OR

- 5 (a) What is piezoelectric effect? Explain the production of ultrasonic waves using piezoelectric effect with neat circuit diagram.
- (b) Give some applications of ultrasonics.

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R15**UNIT – III**

- 6 (a) Give the physical significance of wave function? What does the square of the wave function signify?
(b) Show that the solution of Schrodinger's equation for a particle in an infinite potential well leads to the concept of quantization of energy.

OR

- 7 (a) What are the drawbacks of classical free electron theory?
(b) Explain the formation of bands in solid on the basis of Kronig-Penney model.

UNIT – IV

- 8 (a) Describe the direct and indirect band gap semiconductors with suitable examples and give their applications.
(b) Explain the formation and volt-ampere characteristics of a p-n junction diode.

OR

- 9 (a) Compare and contrast ferromagnetism with ferrimagnetism.
(b) Draw the hysteresis loop for a ferromagnetic material and explain it on basis of domain theory.

UNIT – V

- 10 (a) Describe the differences between the Type-I and Type-II superconductors.
(b) What is Josephson effect? How a Josephson junction functions as a switch?

OR

- 11 (a) Explain the significance of nano-scale in nanomaterials.
(b) Describe the synthesis of nanomaterials one each by top-down and bottom up approaches.

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