

B.Tech I Year II Semester (R15) Regular &amp; Supplementary Examinations May/June 2017

**ENGINEERING PHYSICS**

(Common to IT, ECE, EIE and ME)

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- What do you understand by population inversion?
  - Explain the principle of optical fiber.
  - Define unit cell and space lattice.
  - Write any two applications of X-ray diffraction.
  - Write about matter waves.
  - What are the drawbacks of classical free electron theory?
  - Write any two applications of Hall effect.
  - Write the properties of Ferro magnetic materials.
  - Explain Meissner effect.
  - Give the physical significance of nanoscale.

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

- 2 (a) Explain how Newton's rings are formed in the reflected light. Derive an expression for diameter of bright ring.
- (b) Newton's rings are observed in the reflected light of wavelength  $5900 \text{ \AA}$ . The diameter of  $10^{\text{th}}$  dark ring is 0.5 cm. Find the radius of curvature of lens used.

**OR**

- 3 (a) With the help of suitable diagram, explain the construction and working of He – Ne laser.
- (b) Distinguish between Homo and Heterojunction semiconductor lasers.

**UNIT – II**

- 4 Show that FCC is the most closely packed of three cubic structures.

**OR**

- 5 Explain working and construction of Piezoelectric method of ultrasonic wave production.

**UNIT – III**

- 6 Show that the energies of a particle in a potential box are quantized.

**OR**

- 7 (a) Explain the origin of energy bands in solids.
- (b) Distinguish between conductor, insulators and semiconductors.

**UNIT – IV**

- 8 (a) Write a note on drift and diffusion currents.
- (b) Derive an expression for Einstein equation.

**OR**

- 9 What is Bohr magneton? Explain the origin of magnetic moment in materials.

**UNIT – V**

- 10 (a) Write general properties of superconductors.
- (b) Distinguish between type – I and type – II superconductors.

**OR**

- 11 (a) Describe the method of Top down and Bottom up approaches in nano material preparation.
- (b) Write optical properties of nano materials.

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