

**B. Tech I Year I Semester Regular Examinations, December 2017**  
**ENGINEERING PHYSICS**  
(Common to CSE & EEE)

Time: 3 hours

Max Marks: 70

**PART – A**

1. Answer any **ten** questions (10 x 2 = 20 Marks)

- (a) What are Newton rings and how they are formed.
- (b) Define the term angle of acceptance.
- (c) Write any one example for each three level and four level LASER system.
- (d) Define space lattice and unit cell
- (e) What are the ultrasonic waves?
- (f) What is a wave function? Explain its physical significance.
- (g) What are the main postulates of quantum free electron theory of a metal?
- (h) What is normalization condition of a wave function?
- (i) What is drift and diffusion current?
- (j) What is a hard magnetic material? Give the examples.
- (k) What is BCS theory of superconductivity.
- (l) List any two applications of Nano materials.

**PART - B**

Answer all five units (5 x 10 = 50 Marks)

**UNIT-I**

2. (a) Describe the interference in thin film by reflection with ray diagram.  
(b) Calculate the thickness of air film at 10<sup>th</sup> dark ring in Newton's rings system viewed normally by a reflected light of wavelength 500 nm. The diameter of the 10<sup>th</sup> dark ring is 2mm.

OR

3. (a) Describe with principle, construction and working of semiconductor laser.  
(b) A silica optical fiber has a core refractive index of 1.50 and a cladding refractive index of 1.47. Calculate Numerical aperture.

**UNIT-II**

4. (a) Discuss the X-ray diffraction technique. Describe the method of identification of a crystal system using powder Bragg's method  
(b) Sketch the following planes in a cubic unit cell (1 0 1) (1 2 1) and (0 1 0)

OR

5. (a) What are the properties of ultrasonic waves.  
(b) Explain the production of ultrasonic waves using the piezoelectric method.

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**UNIT-III**

6. (a) Solve Schrodinger's time independent wave equation in one dimension for a particle confined to one-dimensional infinite potential well. Obtain the energy Eigen values and Eigen functions.

(b) What are the characteristics properties of matter waves.

OR

7. (a) Describe the classifications of solids.

(b) Find the relaxation time of conduction electrons in a metal of resistivity  $1.54 \times 10^{-8} \Omega\text{-m}$ , if the metal has  $5.8 \times 10^{28}$  conduction electrons per  $\text{m}^{-3}$ .

**UNIT-IV**

8. (a) What is pn junction diode? How does a pn junction diode work?

(b) What is band gap of semiconductor? Mention the difference between direct and indirect band gap.

OR

9. (a) Explain the B-H curve with hysteresis loop.

(b) What do you mean by magnetic dipole moment? Mention the difference between electric dipole moment and magnetic dipole moment?

**UNIT-V**

10. (a) Explain the phenomenon of superconductivity with examples.

(b) State and explain Meissner effect. Show that a superconductor in its superconducting state acts as a perfect diamagnet.

OR

11. (a) Explain top down and bottom up methods for the synthesis of Nano materials.

(b) Explain properties of Nano materials

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