

B.E./B.TECH. Degree Examination, January 2021

Semester - I

PH16151- Engineering Physics

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. The Miller Indices parallel to Y & Z axes are (a) (001) (b) (111) (c) (010) (d) (100)
2. What is the effect of Annealing on elasticity of materials?
(a) Increases (b) Decreases (c) has no effect (d) Distorts the material.
3. Sonogram works on the principle of
(a) Piezoelectric effect (b) Magnetostriction effect (c) Doppler effect (d) Photoelectric effect
4. The refractive index _____ varies in Graded Index optical fibre
(a) Tangentially (b) Radially (c) Longitudinally (d) Transversely
5. The lattice constant of cubic crystal is 2.5\AA . Find the lattice spacing for (310) and (213) planes in the lattice.
6. What is the significance of stress-strain diagram?
7. For a free particle moving within a one dimensional potential well, the ground state energy cannot be zero. Why?
8. How are electrons and holes confinement made in the active region of heterojunction Semiconductor laser?

PART B - (4 X 16 = 64 marks)

09. (a) (i) Show that for a cubic structure the interplanar distance 'd' is related to miller indices and cell edge length. (4)
(ii) Calculate the number of atoms per unit cell, coordination number and Packing factor of BCC and FCC. (12)
- (OR)**
- (b) (i) Derive an expression for the internal bending moment of a beam in terms of radius of curvature. (8)
(ii) State Hooke's law of elasticity. Draw stress-strain diagram and discuss the behavior of ductile material while loading. (8)
10. (a) (i) Describe with necessary theory Lee's disc method of determination of Thermal conductivity of a bad conductor. (10)

- (ii) Derive an expression for effective thermal conductivity of compound media connected in series. (6)

(OR)

- (b) (i) Derive an expression for Planck's radiation law and discuss the same for shorter and longer wavelength. (14)
- (ii) In a Compton scattering experiment, the incident photon have wavelength of 3\AA . What is the wavelength of scattered photons if they are viewed at an angle of 60° to the incident direction? (2)

11. (a) Explain the various factors affecting the architectural acoustics of buildings and their remedies. (16)

(OR)

- (b) What are Ultrasonic waves? Explain with neat circuit, the generation of ultrasonic waves using Piezo electric oscillator. (16)

12. (a) (i) Discuss the various modes of vibration of CO_2 molecule. (6)
- (ii) Describe the construction and working of CO_2 laser with necessary diagram. (10)

(OR)

- (b) (i) Describe the propagation of light through optical fibre and obtain an expression for Numerical Aperture. (10)
- (ii) Explain the fibre optical communication system with a neat block diagram. (6)