Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 81082

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

First Semester

Civil Engineering

PH 2111/PH 13/080040001 — ENGINEERING PHYSICS – I

(Common to all branches)

(Regulations 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is cavitations?

2. Why can loudspeaker not be used to produce ultrasonic?

3. What is the function of helium atoms in He-Ne laser?

4. Give any two differences between homo-junction and hetero-junction lasers.

5. Calculate the numerical aperture for an optical fibre immersed in water with a core index of 1.56 and cladding index of 1.52 (Refractive index for water is 1.33).

6. How does an optical Fibre work as a temperature sensors?

7. State Kirchoff's law of heat radiation.

8. Write the principle of electron microscope.

9. Distinguish between interplanar spacing and iteratomic spacing.

10. What is the coordination number of ZnS?

PART B — ($5 \times 16 = 80$ marks)

11. (a) What is magnetostrictive effect? Describe with principle the magnetostrication method of producing ultrasonic.

Or

(b) Briefly explain the three types of non-destructive testing methods using ultrasonic with a neat diagram.

12. (a) Explain the operation of a gas laser with the essential components. How does stimulated emission take place with the exchange of energy between He-Ne atoms? (16)

Or

(b) With a neat sketch explain the function of homojunction semiconductor laser. Explain the preparation of hologram with a suitable diagram. (16)

13. (a) Explain the various types of optical fibres and discuss the double crucible technique of fibre drawing.

Or

(b) With suitable sketches, explain the construction and working of detectors

14. (a) (i) Solve Schrodinger wave equation for a free particle in a one-dimensional box and find its energy values. (12)

(ii) X-rays of wavelength λ = 0.2 mm are scattered from a block of graphite. The scattered X-rays are observed at an angle of 45.0 to the incident beam. Calculate the wavelength of the X-rays scattered at this angle. Find the fraction of energy lost by the photon in this collision. (4)

Or

(b) (i) Derive Planck's radiation law and explain the energy spectrum of a blackbody. (12)

(ii) Calculate the minimum energy of a neutron confined to a one-dimensional potential well of width 10^{-14}m. (Mass of neutron = 1.672×10^{-27} kg), By how much does this minimum energy change if neutron is replaced by a proton? (4)

15. (a) (i) Explain the hexagonal closed packed structure and obtain its atomic packing factor. (10)

(ii) Sodium chloride crystallizes in FCC structure. The density of sodium chloride is 2.18×10^3 Kg/m^3. Calculate the distance between two adjacent atoms. The atomic weight of sodium and chlorine are 23 and 35.5 respectively. (6)

Or

(b) (i) What is line defect? Explain edge dislocation using a neat diagram. What are positive and negative edge dislocations? (10)

(ii) Describe the method of determining Miller indices of a given plane in a cubic lattice. (6)

———————