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Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 91138

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

First Semester

Civil Engineering

PH 8151 — ENGINEERING PHYSICS

(Common to: All Branches)

(Regulations – 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the stress-strain diagram for brittle and ductile materials.

2. Why I-shaped girders are desired?

3. Give the wave equation for plane progressive waves.

4. Differentiate active and passive fiber optic sensors.

5. What are two modes in which heat conduction takes place in solids?

6. Give the heat flow rate equation for a compound media of three layers.

7. What are the two important characteristics of black body radiation?

8. Write the physical significance of Schrodinger Wave Function Ψ?

9. What are Miller indices?

10. Explain how line defects help in plastic deformation of solids.

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PART B — (5 × 16 = 80 marks)

11. (a) Explain non-uniform bending method with suitable theory for determination of Young's modulus of a material of the beam. (16)

Or

(b) Describe an experimental method with suitable theory to determine the moment of inertia of the circular disc of the torsion pendulum. (16)

12. (a) (i) Derive Einstein's relations for spontaneous and stimulated emission of radiation . (12)

(ii) Obtain the ratio of Stimulated emission rate to stimulated absorption rate to discuss population inversion. (4)

Or

(b) Discuss the various types of optical fiber (material wise and refractive index wise) and the type of losses associated with optical fibers at various frequency/wavelength regions. (8+8)

13. (a) Explain Forbe's method to determine the thermal conductivity of a good conductor. (16)

Or

(b) Explain Lee's Disc method to determine the thermal conductivity of a poor conductor. (16)

14. (a) What is Compton Effect? Derive an expression for Compton shift of wavelength. (2+14)

Or

(b) Solve time independent Schrödinger wave equation for an electron trapped in a potential well and obtain eigen functions and energy eigen values for the electron. (16)

15. (a) Describe elaborately the Seven Crystal Systems and 14 Bravais lattices with suitable diagrams. (16)

Or

(b) (i) Derive the packing factor for HCP crystal structure (10)

(ii) Write short notes on crystal imperfections and its advantages. (6)

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