

Question Paper Code: 27470

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2015

Civil Engineering

First Semester

PH 6151: ENGINEERING PHYSICS - I

(Common to all branches)

(Regulation: 2013)

Time: 3 Hours

[Max. Marks: 100

Answer ALL questions.

$PART - A (10 \times 2 = 20 Marks)$

- 1. What is a Bravais lattice? How many lattice types are possible in 3-dimensional space?
- 2. How carbon atoms are arranged in diamond and graphite structures?
- 3. An elastic wire is cut into half its original length. How will it affect the maximum load the wire can support?
- 4. The ends of two rods A and B with thermal conductivities k₁ and k₂ respectively are maintained at temperatures θ₁ and θ₂. The rods are of equal length. What is the condition under which there will be equal rate of flow of heat through both the rods?
- What will be the minimum energy of an electron in one-dimensional box of width 10 nm?
- Peak emission of radiation from sun is at a wavelength of 500 nm. Estimate the temperature of sun. (Wien's displacement constant = 2.898 × 10⁻³ m K)
- 7. A hall of volume 50000 m³ is designed to have a reverberation time of 1.4 s. What should be the total absorption in the hall?
- 8. What is magneto-striction effect? How it is used for production of ultrasound?
- Why Nd-YAG laser is more efficient than a Ruby laser?
- 10. Give any four advantages of fibre optic communication system.

$PART - B (5 \times 16 = 80 Marks)$

	11.	(a)	(i)	Describe the arrangement of atoms in a hexagonal close packed (hcp) structure.	(4)
			(ii)		(12)
		(b)	(i)	Describe Bridgman method of growing single crystals. What are the advantages and limitations of this method ?	(8)
			(ii)	Derive an expression for inter planar spacing 'd' between (hkl) planes of a cubic structure.	(8)
	12.	(a)	(i)	Derive an expression for the depression produced at the free end of a cantilever due to the load.	(12)
			(ii)	Give reasons why the cross-section of girders are I-shaped and made of steel.	(4)
		(L)	(*)	OR Describe Lee's disc method to determine the thermal conductivity of bad	
		(b)	(i)		(12)
			(ii)	A copper rod of length 50 cm and cross-sectional area 6×10^{-2} cm ² is connected in series with an iron rod of same area of cross-section and	(
				length 25 cm. One end of copper is immersed in boiling water. The far end	
				of the iron rod is in an ice bath of 0 °C. Find the rate of transfer of heat from boiling water to ice bath. (Thermal conductivity of copper and iron	
				are 401 Wm ⁻¹ K ⁻¹ and 80 Wm ⁻¹ K ⁻¹ respectively).	(4)
	13.	(a)	(i)		(12)
			(ii)	What is the momentum and de Broglie wavelength of an electron accelerated through a potential difference of 56 V. OR	(4)
		(b)	(i)		(12)
		(0)	(ii)	Compare scanning electron microscope with transmission electron microscope.	(4)
	14.	Discuss the important factors that affect the acoustics of an auditoric methods to maintain good acoustics. OR			(16)
			Exp	lain the working of ultrasonic flaw detector with a block diagram. Explain	
		the different modes of scanning.		(16)	
	15.	(a)	(i) (ii)	Explain the principle of LASER. Describe the construction and explain the working principle of CO ₂ laser	(4)
					(12)
			(1)	OR STANDARD CONTRACTOR OF THE STANDARD CONTRACTO	(4)
		(b)	(i) (ii)	Explain the principle of propagation of light through optical fibre. Derive an expression for acceptance angle and Numerical aperture.	(12)
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