



Question Paper Code : PH 8151

B.E./B.Tech. DEGREE EXAMINATION, 2017
First Semester

Civil Engineering
PH-8151 – ENGINEERING PHYSICS
(Common to All Branches)

(Regulations 2017)

Time : Three Hours

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Maximum :

PART – A(10×2=20 Marks)

1. Draw stress-strain diagram for brittle and ductile material.
2. What is non-uniform bending and why is said to be non-uniform ?
3. Why population inversion is necessary for laser action and how it can be achieved ?
4. State the condition to achieve total internal reflection.
5. What is the need for thermal insulation in buildings ?
6. State the function of bimetallic strip.
7. What is scanning electron microscope ?
8. Mention any two physical significance of wave function.
9. Sketch (111) plane for a cubic structure.
10. What are Frenkel and Schottky imperfections ?

PART – B(5×16=80 Marks)

11. a) i) Derive an expression for the elevation at the centre of the beam which is loaded at both ends.
ii) A Cantilever of steel fixed horizontally is subjected to a load of 225 gm at its free end. The geometric moment of inertia of the cantilever is $4.5 \times 10^{-11} \text{m}^4$. If the length of cantilever and Young's modulus of steel are 1 m and 200×10^9 Pa respectively, calculate the depression at the loaded end.

(OR)

- b) i) What is torsion pendulum ? Explain how it is used to determine the rigidity modulus of the material of a thin wire.
- ii) A wire of length 1 meter and diameter 1 mm is clamped at one of its ends. Calculate the couple required to twist the other end by 90° .
Given modulus of rigidity = 28 GPA.
12. a) i) What are different pumping mechanisms used in lasers ? Explain the principle, construction and working of a homojunction laser with necessary diagram.
- ii) Find the relative population of the two states in a laser that produces a light beam of wavelength 6943\AA at 300K.
- (OR)
- b) i) What are different types of fibre optic sensors ? Explain the working of any two sensors.
- ii) Calculate the numerical aperture and the critical angle of a fibre having core refractive index = 1.50 and a cladding refractive index = 1.45.
13. a) Describe with relevant theory the method of determining the coefficient of thermal conductivity of a bad conductor by Lee's disc method.
- (OR)
- b) Derive an expression for the thermal conductivity through compound media in series and parallel.
14. a) i) Obtain the eigen value and eigen function for an electron enclosed in a one dimensional potential box.
- ii) Calculate the minimum energy an electron can possess in an infinitely deep potential well of width 4 nm.
- (OR)
- b) i) Derive Planck's law for a black body radiation and hence deduce Wien's law and Rayleigh Jean's law.
- ii) A neutron of mass 1.675×10^{-27} kg is moving with a kinetic energy 10KeV. Calculate the De-broglie wavelength associated with it.
15. a) Define the terms atomic radius and packing factor. Calculate the above for SC, BCC and FCC structures.
- (OR)
- b) Describe Czochralski method of crystal growth. Derive an expression for the interplanar spacing of (hkl) planes of a cubic structure.
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