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**Question Paper Code : 11263**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**First Semester**

**Civil Engineering**

**HS 1102 – ENGINEERING PHYSICS – I**

**(Common to all branches)**

**(Regulations 2008)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. A quartz crystal of thickness of 0.001 metre is vibrating at resonance. Calculate the fundamental frequency. Given  $Y$  for quartz =  $7.9 \times 10^{10}$  N/m<sup>2</sup> and  $\rho$  for quartz = 2650 kg/m<sup>3</sup>.
2. How does ultrasonic soldering help to remove the oxide layer formation during soldering ?
3. Distinguish between spontaneous and stimulated emission.
4. Define population inversion and pumping.
5. What are the mechanisms that cause attenuation or loss of signal in optical fibres ?
6. Define numerical aperture.
7. A wave function does not have any physical significance. Justify.
8. Find the energy of the neutron in electron volts whose deBroglie wavelength is 4 Å.
9. Distinguish between crystalline and amorphous solids.
10. Define atomic radius and coordination number.

**PART – B (5 × 16 = 80 Marks)**

11. (a) (i) What is magnetostriction effect ? Explain in detail the principle, construction and working of a magnetostriction generator. (8)  
(ii) Discuss in detail the industrial applications of ultrasonics. (8)

**OR**

- (b) (i) Explain in detail the principle, construction and working of a piezoelectric oscillator. (10)  
(ii) Discuss briefly the detection of ultrasonic waves. (6)
12. (a) Describe the principle, construction and working of heterojunction semiconducting laser with necessary diagram.

**OR**

- (b) Explain the principle of Holography. How will you create a hologram of an object and recreate the image of the original object ?

13. (a) (i) Explain the different types of fibres on the basis of refractive index and modes of propagation. (8)  
(ii) Describe the double crucible technique for the optical fibre manufacturing. (8)

**OR**

- (b) Explain the working of  
(i) displacement sensors (8)  
(ii) fibre optic endoscope (8)

14. (a) Elaborate the experiment to verify Compton effect. Attain the expression for the Compton shift wavelength.

**OR**

- (b) Derive the expression for Schrodinger time independent and dependent wave function.

15. (a) Explain the crystal structures of NaCl, ZnS and Diamond.

**OR**

- (b) Define packing factor and obtain the equation to find packing factor for HCP structure.