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

Question Paper Code: 51013

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

First Semester

Civil Engineering

15UPH103 - ENGINEERING PHYSICS

(Common to ALL branches)

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The lattice constant of a bcc unit cell is 0.*2864 nm.* The nearest neighbor distance is

   (a) 0.54 *nm* (b) 1.2 *nm* (c) 0.496 *nm* (d) 0.248 *nm*

2. The packing factor for Fe unit cell is

   (a) 0.92 (b) 0.74 (c) 0.68 (d) 1

3. When same music is played in veena and violin, we shall hear sounds of

   (a) same intensity (b) same quality
   (c) different quality (d) same quality and same intensity

4. Ultrasonic have frequencies

   (a) below 20*Hz* (b) above 20*Hz* but below 20*kHz*
   (c) above 20*kHz* (d) below infrasonics

5. In circularly polarized light

(a) the magnitude of light vector remains same but orientation change
(b) the magnitude of light vector changes but orientation remains the same
(c) the magnitudes and orientations both vary continuously
(d) none of these

6. Optical resontator

(a) acts as pumping mechanism (b) provide positive feedback and amplification
(c) provide feedback only (d) provide amplification only

7. In Compton scattering, at what angle of scattering, the wavelength of the scattered photon will be maximum

(a) 0^0 (b) 45^0 (c) 60^0 (d) 90^0

8. The de Broglie wavelength of an object equal to

(a) h/mv (b) h/c (c) h/λ (d) All the above

9. The property of the body due to which a body opposes change in its shape or size when a deforming force acts on it and regains its original shape and size when external force is removed

(a) Toughness (b) Elasticity (c) Plasticity (d) Ductility

10. The process of transfer of heat in solids is called as

(a) Convection (b) Radiation (c) Conduction (d) All the above

PART - B (5 x 2 = 10 Marks)

11. Define basis.

12. Define reverberation.

13. What are the characteristics of laser?

14. Write an expression for de Broglie wavelength of an electron.

15. State Hooke's law.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Define number of atoms in a unit cell, atomic radius and packing density. (6)

(ii) Show that the packing density of HCP $=\frac{\pi}{3\sqrt{2}}$. (10)

Or

(b) (i) Derive relationship between inter-planar and inter-atomic distance. (8)

(ii) Describe Bridgman method of growing crystal. (8)

17. (a) (i) Explain magnetostriction effect. Describe the magnetostriction method of producing ultrasonic waves. (12)

(ii) Calculate the frequency of ultrasonic waves that can be generated by a nickel rod of length $4cm$. (Young's modulus of nickel=$207GPa$ and density of nickel = $8900kg/m^3$). (4)

Or

(b) Explain Piezo-electric effect. Describe the Piezo-electric method of producing ultrasonic waves. (16)

18. (a) Derive expression for elliptically polarized light. From that show plane polarized and circularly polarized are special cases of elliptically polarized light. (16)

Or

(b) Explain in detail about CO_2 laser. (16)

19. (a) What is Compton effect? Derive expression for change in wavelength. (16)

Or

(b) Derive Schrodinger time independent and time dependent wave equation. (16)

20. (a) Describe with theory Lee's disc method of determination of thermal conductivity of a bad conductor. (16)

Or

(b) What is cantilever? Derive an expression for the depression at the free end of a cantilever. (16)

51013