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**Question Paper Code: 50003**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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)

- The Miller indices of the diagonal plane of a cube are
  - 110
  - 100
  - 111
  - 011
- The crystal structure of silver is
  - FCC
  - BCC
  - HCP
  - none of these
- Decibel is
  - a musical instrument
  - a musical note
  - a measure of sound level
  - the wavelength of noise
- Waves of frequencies beyond the upper audible limit are called
  - infrasonic waves
  - supersonic waves
  - ultrasonic waves
  - none of these
- Which of the following phenomena produces the colours in soap bubble
  - diffraction
  - interference
  - polarisation
  - dispersion

6. The life time of the excited hydrogen atom is of the order of  
(a)  $10^{-3}$  sec      (b)  $10^{-5}$  sec      (c)  $10^{-8}$  sec      (d)  $10^{-2}$  sec
7. The equation of motion of matter wave was derived by  
(a) Heisenberg      (b) Bohr      (c) de Broglie      (d) Schrodinger
8. According to the Compton theory, the wavelength increase  $\Delta\lambda$  is \_\_\_\_\_ of the incident wavelength.  
(a) dependent      (b) independent      (c) same      (d) none of these
9. The ratio of lateral contraction to longitudinal strain, when a body undergoes a linear tensile strain is known as  
(a) modulus of elasticity      (b) Young's modulus  
(c) Bulk modulus      (d) Poisson's ratio
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 unit cell.
12. What is reverberation?
13. Define pumping.
14. What is de Broglie hypothesis?
15. State Newton's law of cooling.

PART - C (5 x 16 = 80 Marks)

16. (a) Derive the expression for inter-planar distance between consecutive plane described by Miller indices (hkl). (16)
- Or
- (b) Show that a hexagonal unit cell demands an axial ratio of  $c/a = 1.633$ . (16)
17. (a) Describe with neat sketch the principle, construction and working of a piezoelectric oscillator. (16)

Or

(b) Explain how the velocity of ultrasonic wave is determined using acoustic grating. (16)

18. (a) Derive Einstein's relation for the stimulated emission of radiation and hence find the relation between the stimulated emission and the spontaneous emission. (16)

Or

(b) Describe the principle, construction and working of a CO<sub>2</sub> laser. (16)

19. (a) Derive the Schrodinger's time-dependent wave equation. (16)

Or

(b) Derive the mathematical derivation for the Compton shift in wavelength. (16)

20. (a) Derive an expression for the depression of the free end of a cantilever fixed at one end and loaded at the other end. (16)

Or

(b) Describe Lee's disc method for determining thermal conductivity of a poor conductor. (16)

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