Question Paper Code: 91003

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

First Semester

Civil Engineering

19UPH103- ENGINEERING PHYSICS

(Common to ALL branches)

(Regulation 2019)

Duration: One hour   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The coordination number for FCC lattice is   CO1- R

   (a) 12   (b) 6   (c) 8   (d) 24

2. The number of atoms per unit cell for a simple cubic crystal structure is   CO1- R

   (a) 4   (b) 1   (c) 2   (d) 6

3. Atomic packing factor for BCC crystal lattice is   CO1- R

   (a) 32%   (b) 52%   (c) 74%   (d) 68%

4. If N_1 and N_2 are the number of atoms in ground state and excited state   CO2- R
   respectively, then in population inversion

   (a) $N_1 < N_2$ (b) $N_1 > N_2$ (c) $N_1 = N_2$ (d) $N_1 > 2N_2$

5. A hologram contains the information about   CO2- R

   (a) Amplitude of the object   (b) Phase of the object

   (c) Both amplitude and phase of the object   (d) None of these

6. If λ_m is the wavelength corresponding to maximum energy and T is the   CO3- R
   absolute temperature, then according to Wien's displacement law,

   (a) $\lambda_m T$ = constant   (b) λ_m /T = constant   (c) $\lambda_m T^{1/2}$ = constant   (d) $\lambda_m / T^{1/2}$ = constant

7. According to Planck's hypothesis, the exchange of energy between the radiation and matter is not continuous but it is limited to the integral multiple of   CO3- R

(a) $1/h\nu$ (b) h/ν (c) ν/h (d) $h\nu$

8. If a particle having mass m is moving with velocity v, the deBroglie wavelength associated with the matter wave is   CO3- R

(a) $\lambda = h/mv$ (b) $\lambda = h/mv^2$ (c) $\lambda = h^2/mv$ (d) $\lambda = mv/h$

9. The modulus of elasticity is   CO4- R

(a) Stress $\times$ Strain   (b) Stress / Strain   (c) Strain / Stress   (d) Stress$\times$ Young's modulus

10. The ratio of lateral strain to linear strain is   CO4- R

(a) Elastic limit   (b) Young's modulus   (c) Rigidity modulus   (d) Poisson's ratio

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Derive the relation between interplanar distance 'd' and lattice constant 'a' for a plane whose Miller indices are (h k l).   CO1- U   (8)

12. Prove the existence of stimulated emission of radiation for laser action to take place using Einstein's theory.   CO2- U   (8)

13. Show that the atomic packing factor for FCC is 74%.   CO1- U   (8)

14. Show that Compton shift in wavelength depends on scattering angle using Compton effect.   CO3- U   (8)

15. What is a cantilever? Derive an expression to find the depression produced in a cantilever fixed at one end and loaded at the other end.   CO4- U   (8)