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**A Reg. No. :**

**Question Paper Code: 51003**

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

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| 1. | The atoms or molecules are arranged in a irregular fashion is called as  | CO1- R |
|  | (a) Single crystal | (b) Solid | (c) Amorphous | (d) Poly crystal |
| 2. | Identify the given crystal system, a = b ≠ c ; α = β = γ = 90°  | CO1- App |
|  | (a) Cubic | (b) Tetragonal | (c) Triclinic$ $ | (d) Hexagonal |
| 3. | Sound waves of frequencies below 20 Hz are termed as  |  CO2- R |
|  | (a) Ultrasonics | (b) Audible range | (c) Noises | (d) Infrasonics |
| 4. | What is the basic principle behind the Piezoelectric oscillator  |  CO2- R |
|  | (a)Piezoelectric effect | (b) Inverse Piezoelectric effect |
|  | (c) Doppler effect | (d) None of these |
| 5. | The Superposition of two waves is known as  | CO3- Ana |
|  | (a) Diffraction | (b) Interference | (c) Reflection | (d) Absorption |
| 6. | Pumping method employed in Semiconductor laser is  | CO3- R |
|  | (a) Optical pumping | (b)Electrical pumping |
|  | (c) Electrical discharge method | d) Direct pumping |
| 7. | Calculate the Compton shift, when the angle of scattering (ɸ) is Zero  | CO4- App |
|  | (a) 0 | (b) 1 | (c) 2 | (d) 3 |
| 8. | Show de – Broglie wavelength (λ) in terms of energy  | CO4- R |
|  | (a)$ λ = h / 2mE$ | (b)$ λ = h /\sqrt{2mE}$ | (c)$ C. λ = h / \sqrt{eV}$ | (d)$ λ =h /\sqrt{2meV}$ |
| 9. | Relate the ratio between lateral strain and longitudinal strain  | CO5- R |
|  | (a)Young’s modulus | (b)Bulk modulus | (c) Poisson’s ratio | (d) All the above |
| 10. | Recall the unit of Thermal conductivity  | CO5- R |
|  | (a) N / m2 | (b) Ω-1 m-1 | (c) W / m2 | (d) Wm-1K-1 |
|  | PART – B (5 x 2= 10 Marks) |
| 11. | Define Coordination number. CO1- R |
| 12. | State Weber-Fechner law. CO2 -R  |
| 13. | Justify the term Stimulated emission. CO3 -E |
| 14. | Summarize the physical significance of wave function. CO4 -U |
| 15. | State Hooke’s law. CO5 -R |
|  | PART – C (5 x 16= 80 Marks) |
| 16. | (a) | (i) What are Miller indices and Explain how they are determined? | CO1- R |  (8) |
|  |  |  (ii) Show that the packing factor for FCC and HCP are equal | CO1 -App |  (8) |
|  |  | Or |  |  |
|  | (b) | Enumerate Bridgman crystal growth technique in detail | CO1 -U |  (16)  |
|  |  |  |  |   |
| 17. | (a) | Describe Piezoelectric method of producing ultrasonic sound waves with the neat diagram.  | CO2 -U |  (16) |
|  |  | Or |  |  |
|  | (b) | (i) Explain the determination of velocity of ultrasonic using an  acoustical grating element.   | CO2- U |  (12) |
|  |  | (ii) Give any four Industrial applications of Ultrasonic sound  waves.  | CO2- U |  (4) |
|  |  |  |  |  |
| 18. | (a) | Show that plane polarized light and circularly polarized lights are special cases of elliptically polarized light.  | CO3 -App |  (16) |
|  |  | Or |  |  |
|  | (b) |  (i) Explain the Principle, construction and working of CO2 laser  with a neat Energy level diagram.   | CO3- U |  (12) |
|  |  | (ii) Evaluate the wavelength of emission from GaAs whose  band gap is 1.44 eV.  | CO3 -App |  (4) |
|  |  |  |  |  |
| 19. | (a) | Deduce Schrodinger’s time dependent and time independent wave equations.  | CO4- U |  (16) |
|  |  | Or |  |  |
|  | (b) | Recall Compton effect. Obtain an expression for the Compton shift.   | CO4- C |  (16) |
|  |  |  |  |  |
| 20. | (a) | What is meant by Cantilever? Derive an expression for the depression produced due to load hanging at the end of the Cantilever beam.  | CO-5 U |  (16) |
|  |  | Or |  |  |
|  | (b) | Define Thermal conductivity. Explain the determination of a bad conductor thermal conductivity by Lee’s disc method with a neat diagram.  | CO5- E | (16) |