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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)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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) | | (b) | | | (c) | (d) | | | |
| 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) |