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**Reg. No. :**

**Question Paper Code: 31003**

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

First Semester

Civil Engineering

01UMA103 - ENGINEERING PHYSICS

(Common to ALL branches)

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

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| 1. | Ultrasonic waves higher than 3MHz cannot be produced using magnetostriction oscillator. Why? CO1- U | | | |
| 2. | List four methods of detecting ultrasonic waves. CO1- U | | | |
| 3. | What do you mean by population inversion? CO2- U | | | |
| 4. | Define optical pumping. CO2- U | | | |
| 5. | What is splicing? Mention its types. CO3- U | | | |
| 6. | Distinguish between an active and passive sensor. CO3- U | | | |
| 7. | State Planck’s hypothesis on black body radiation. CO4- U | | | |
| 8. | What is meant by degenerate and non-degenerate states? CO4- U | | | |
| 9. | Draw the planes which are having the Miller indices of (111) and (110). CO5- U | | | |
| 10. | What are miller indices? CO5- U | | | |
|  | PART – C (5 x 16= 80Marks) | | | |
| 11. | (a) | Describe the construction and working of piezo electric generator. | CO1- U | (16) |
|  |  | Or |  |  |
|  | (b) | Explain in detail the ultrasonic method of flaw detection by reflection and transmission modes with a suitable block diagram. Briefly explain the three different ultrasonic scans and their displays which are common in practice. | CO1- U | (16) |
|  |  |  |  |  |
| 12. | (a) | Explain the principle, construction and working of Co2 laser. | CO2- U | (16) |
|  |  | Or |  |  |
|  | (b) | Describe the construction and reconstruction methods of a hologram. | CO2- U | (16) |
|  |  |  |  |  |
| 13. | (a) | Discuss the various losses in optical fibers? | CO-3 Ana | (16) |
|  |  | Or |  |  |
|  | (b) | Explain the working of fiber optic communication system with a neat block diagram. | CO3- Ana | (16) |
|  |  |  |  |  |
| 14. | (a) | Derive the time independent Schrödinger’s wave equation and apply it to determine the energy of a particle trapped in one dimension box. | CO4-App | (16) |
|  |  | Or |  |  |
|  | (b) | What is compton effect? Derive an expression for the frequency of the scattered photon in terms of the frequency of incident radiation and scattering angle. | CO4- App | (16) |
|  |  |  |  |  |
| 15. | (a) | Deduce the atomic packing factor of FCC crystal with neat diagram | CO5-U | (16) |
|  |  | Or |  |  |
|  | (b) | Show that in ideal hexagonal closed packed structure c/a ratio is 1.663 and the density of atomic packing factor equals to that of the face-centered cubic structure. | CO5-U | (16) |