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Question Paper Code: 41003

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

First Semester

Civil Engineering

14UPH103 – ENGINEERING PHYSICS

(Common to ALL branches)

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 1 = 10 Marks)

1. Ultra sonics are sound waves having frequency.
   (a) Less than 20 Hz   (b) Greater than 20000 Hz
   (c) Between 20 Hz and 20000 Hz   (d) Greater than 20 Hz

2. Two dimensional scanning method is also known as

   (a) A- scan   (b) B- scan   (c) C- scan   (d) none

3. The method of achieving population inversion in Nd:YAG laser is
   (a) Electrical discharge   (b) Direct electrical conversion
   (c) Inelastic collision   (d) Optical pumping

4. The principle of semi conductor laser is

   (a) Forward biased   (b) Reverse biased
   (c) Energy of photons   (d) None of these

5. The principle of propagation of light through optical fibre is
   (a) Total Internal Reflection   (b) Refraction
   (c) Diffraction   (d) Reflection

6. Joining of two fibres is called as
   (a) Welding   (b) Soldering   (c) Splicing   (d) Sensor

7. $|\psi|^2$ is a measure of

    (a) Probability density   (b) wave function

    (c) Velocity   (d) Frequency

8. _____ is application of Schrodinger's wave equation

    (a) Particle in a box   (b) Scattering of electron by a photon

    (c) Electron diffraction by a single slit   (d) none of these

9. The co-ordination number of BCC structure is

    (a) 6   (b) 8   (c) 12   (d) 16

10. The primitives are equal and interfacial angles are equal to 90^0 is called

    (a) Cubic   (b) mono clinic   (c) Tri clinic   (d) hexagonal

<center>PART - B (5 x 2 = 10 Marks)</center>

11. What is magnetostriction effect?

12. Explain the term population inversion.

13. Calculate the numerical aperture and acceptance angle of a fibre with a core index of 1.5 and cladding 1.48.

14. What are degenerate energy levels?

15. Define: Bravais Lattice.

<center>PART - C (5 x 16 = 80 Marks)</center>

16. (a) (i) With neat circuit diagram, explain the production of ultrasonics by Piezo electric oscillator.   (12)

      (ii) State the principle of SONAR.   (4)

<center>Or</center>

    (b) (i) Describe the method of determining velocity of ultrasonic waves using Acoustic Grating.   (10)

      (ii) Explain in detail various scanning methods using ultrasonic waves.   (6)

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17. (a) (i) Derive an expression for Einstein's coefficients A & B. (10)

(ii) Describe the action of holographic recording technique. (6)

Or

(b) (i) Discuss the construction and working of the Homo Junction Semiconductor Laser. (10)

(ii) What is Holography? Explain the construction and reconstruction of a Hologram. (6)

18. (a) Explain the principle and propagation of light through an optical fibre and obtain an expression for numerical aperture and acceptance angle. (16)

Or

(b) (i) With a block diagram describe the Fiber Optic Communication system. (10)

(ii) Discuss the working of a Fiber Optic Endoscope and mention its uses. (6)

19. (a) Deduce an expression for Compton wavelength. (16)

Or

(b) (i) Write a short note on physical significance of wave function. (4)

(ii) Explain the construction and working of Scanning Electron microscope with neat diagram. (12)

20. (a) (i) Define number of atoms in a unit cell, atomic radius. (6)

(ii) Show that the packing density of HCP is 74%. (10)

Or

(b) Explain with neat sketches the different types of crystal defects. (16)

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