Reg. No. :

Question Paper Code: 41103

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2014.

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. Ultrasonic is basically

    (a) a magnetic wave   (b) an inaudible sound
    (c) an electromagnetic wave   (d) an audible sound

2. Two dimensional scanning method is also known as

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

3. Optical resonators

    (a) acts as pumping mechanism   (b) provide positive feedback and amplification
    (c) provide feedback only   (d) none of the above

4. Laser beam is highly

    (a) Coherent   (b) incoherent   (c) scattering   (d) diffraction

5. The loss of optical fibre power is

    (a) Attenuation   (b) dispersion   (c) absorption   (d) reflection

6. In an optical fibre, the inner core is _____ the cladding

    (a) denser than   (b) less denser than

    (c) the same density as   (d) 2 times denser than

7. In Compton scattering, at what angle of scattering, the wavelength of the scattered photon will be maximum

    (a) 0^0 (b) 90^0 (c) 180^0 (d) 120^0

8. Electron beam is made to fall on the specimen using

    (a) condensing lens   (b) projector lens

    (c) objective lens   (d) fluorescent screen

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

PART - B (5 x 2 = 10 Marks)

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.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain Piezo- electric effect. Describe the Piezo-electric method of producing ultrasonic waves.   (12)

    (ii) Calculate the frequency of ultrasonic waves that can be generated by a nickel rod of length $4cm$. (Young's modulus of nickel $=207Gpa$ and density of nickel $= 8900kg/m^3$.   (4)

Or

41103

(b) (i) Determine the velocity of ultrasonic waves by acoustical grating method. (12)

(ii) Mention some medical applications of ultrasonics. (4)

17. (a) Describe the construction and working of Nd: YAG laser with suitable energy level diagram. (16)

Or

(b) (i) Describe the method of construction and reconstruction of images using holography. (12)

(ii) Write any four medical applications of laser. (4)

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) How will you classify optical fibres based on materials, modes and refractive indices. (16)

19. (a) Derive planks law of radiation and hence deduce Wien's displacement law and Rayleigh Jeans law. (16)

Or

(b) Write the principle, working, advantages, disadvantages and applications of scanning electron microscope. (16)

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) (i) Show that d=$\frac{a}{\sqrt{h^2+k^2+l^2}}$, where d- the inter planar distance, a – interatomic distance and h, k, l are Miller indices of parallel planes. (8)

(ii) Write a note on point defects and line defects. (8)

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41103

41103