Register Number: …………………….

B.E / B.TECH DEGREE EXAMINATIONS: DEC 2014

(Regulation 2009)

First Semester

PHY101: ENGINEERING PHYSICS

(Common To all Branches)

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The maximum intensity level of sound with which an ear can tolerate

    a) 80 dB   b) 100 dB

    c) 120 dB   d) 240 dB

2. Which one of the following is not used to detect the Ultrasonic waves

    a) Kundt's tube   b) Piezo electric detector

    c) Sensitive flame method   d) Magnetostriction oscillator

3. The Co – ordination no for simple cubic structure is

    a) 4   b) 8

    c) 6   d) 12

4. The perpendicular distance between any two adjacent planes is called

    a) Interplanar spacing   b) Unit cell

    c) Miller indices   d) Lattice planes

5. In Michelson's interferometer, the wavelength of monochromatic light is determined by using the relation

    a) $\lambda=(d/2n)$ b) $\lambda=(d/3n)$

    c) $\lambda=(d/4n)$ d) $\lambda=(2d/n)$

6. The path difference produced by QWP is

    a) λ b) $\lambda/2$

    c) $\lambda/3$ d) $\lambda/4$

7. Quantum theory was introduced by

    a)   Rayleigh – Jeans   b)   Max Planck

    c)   Stefan   d)   Boltzmann

8. A material particle must exhibit wave like properties in addition to particle nature was suggested by

    a)   Compton   b)   Schroedinger

    c)   de – Broglie   d)   Max Planck

9. The principle behind the construction of Hologram is

    a)   Polarization   b)   Interference

    c)   Reflection   d)   Transmittance

10. The Principle of optical fiber Communication is

    a)   Total internal reflection   b)   Transmittance

    c)   Reflection   d)   Absorption

PART B (10 x 2 = 20 Marks)

11. Identify "Weber- Fechner's law".

12. Tell any four properties of ultrasonic.

13. Demonstrate Bravais lattices.

14. What are the coordination numbers per unit cell for SC, BCC, FCC, HCP structures?

15. Define "Air Wedge."

16. What is a half wave plate?

17. What is Compton effect and Compton shift?

18. Find the energy of an electron moving in one dimension in an infinitely high potential box of width 0.2nm.

19. Distinguish between ordinary light and laser beam.

20. Define acceptance angle of an optical fibre.

PART C (5 x 14 = 70 Marks)

21. a) (i)   Demonstrate Sabine's formula for reverberation time – growth and decay method   (10)

      (ii) What is meant by absorption coefficient?   (4)

(OR)

   b) (i)   Develop the Piezo electric method of producing ultrasonic waves.   (10)

      (ii) A quartz crystal of thickness 1mm vibrates in its fundamental frequency. Calculate the fundamental frequency. (Given: $E = 7.9 \times 10^{10}$ N/m^2 and the density of the quartz crystal is 2650 kg/m^3).   (4)

22. a) (i) Show that atomic packing factor for FCC and HCP are the same. (10)

        (ii) What are Miller indices? (4)

    b) (i) Explain the five basic processing steps involved in liquid penetrant inspection. (10)

        (ii) What are the Advantages of X- ray radiography? (4)

23. a) (i) Explain the construction and working of Michelson's interferometer. (10)

        (ii) Distinguish between elliptically and circulary polarized light. (4)

(OR)

    b) (i) What are isochromatic and isoclinic fringes? How are they analyzed by the use (10)
of photoelastic bench?

        (ii) Predict" Stress –optic law". (4)

24. a) (i) Invent an expression for Compton shift and show that it is independent of the (10)
wavelength of the incident photons.

        (ii) Explain the postulates of Planck's quantum theory. (4)

(OR)

    b) (i) Develop Schrödinger's time independent wave equation. (10)

        (ii) Briefly explain the physical significance of the wave function. (4)

25. a) (i) Explain the construction and working of Nd-YAG laser (10)

        (ii) What are the applications of laser? (4)

(OR)

    b) (i) Predict an expression for numerical aperture and acceptance angle of an optical (10)
fiber.

        (ii) Distinguish between step index and graded index fibre (4)

****