Register Number: ……………………..

B.E / B.TECH DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2009)

First Semester

COMMON TO ALL BRANCHES

PHY101: Engineering Physics

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Audible sound waves lies between
    a) 20Hz to 20,000Hz   b) Below 20Hz
    c) Above 20KHz   d) All the frequency range

2. Sonar is based on the principle of
    a) Echo sounding   b) Doppler shift
    c) Magnetostriction effect   d) Weber Fechner Law

3. The interlplanar distance of (100) plane of a simple cubic form is
    a) $a/\sqrt{2}$ b) $a/\sqrt{3}$
    c) $\sqrt{2}/a$ d) $a/\sqrt{1}$

4. In X-ray fluoroscopy X-ray energy is converted into
    a) Chemical energy   b) Visible light
    c) Electrical energy   d) Magnetic energy

5. When unpolarised light enters a doubly refracting crystal, we get two refracted rays called ordinary O-ray and extraordinary ray E-ray. Which of the following statement is true
    a) Only O-ray is polarized   b) Only E-ray is polarised
    c) Both O-rays and E-rays are polarized   d) Neither O-ray nor E-ray is polarized

6. In interference with two coherent sources,the fringe width varies
    a) Directly as wavelength   b) Inversely as wavelength
    c) Inversely as the distance between the slits and screen   d) Directly as the separation between slits

7. Which one of the following pairs of phenomena illustrates the particle aspect of wave particle duality?
    a) Compton effect and Bragg's law   b) Photoelectric effect and Compton effect
    c) Compton effect and pauli's principle   d) Bragg' law and Photoelectric effect

8. The energy of a particle in a box are given by
    a) Continuous energy spectrum   b) $\dfrac{n^2 h^2 \pi^2}{2ml^2}$
    c) $\dfrac{h^2 \pi^2}{2ml^2}$ d) $\dfrac{hn}{2ml^2}$

9. A laser beam consists of
    a) Light material particles   b) Electrons
    c) Coherent photons   d) Cosmic rays

10. Fibre optic communication uses the phenomenon of
    a) Reflection   b) Polarization
    c) Total internal reflection   d) Interference

PART B (10 x 2 = 20 Marks)

11. State and explain Weber Fechner law.

12. A cinema hall has a volume of 7500m^3.It is required to have a reverberation time of 1.25s.What should be the total absorption in the cinema hall?

13. What is Induced Birefringence?

14. Define unit cell.

15. How optical flatness of a surface is checked using interference phenomena?

16. Give any four technique of testing a material by NDT.

17. Which body is a perfect absorber and radiator. Why?

18. What is Compton effect?

19. The relative refractive index difference for an optical fibre is 0.05 .If the entrance end of the fibre is facing the air medium and refractive index of the core is 1.46 estimate its numerical aperture.

20. Give some applications of laser in engineering and medical field.

PART C (5 x 14 = 70 Marks)

21. a) (i) Discuss the factors that affect the acoustics of buildings and the remedies.   (10)

    (ii) A hall has a volume of 1200m^3.Its total absorption is equivalent to 480sq.m. of (4) open window. What will be the effect on the reverberation time if the audience fills the hall and thereby increases the absorption by another 480 sq.m.of open window?

    (OR)

b) (i) What is acoustic grating? Describe the method of determining the velocity of (10) ultrasonic waves using acoustic grating.

  (ii) Explain SONAR (4)

22. a) (i) Determine the atomic radius,co-ordination number and packing factor for BCC (10) structure.

  (ii) A crystal plane cuts at 3a, 4b and 2c distances along the crystallographic axes. (4) Find the Miller Indices of the plane.

(OR)

  b) (i) Draw a schematic diagram of an ultrasonic flaw detector and explain its action. (10)

  (ii) Distinguish X-ray radiography and fluoroscopy (4)

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

  (ii) Explain quarter wave plate and half wave plate (4)

(OR)

  b) (i) Explain with a block diagram the photo elastic bench (10)

  (ii) What are isoclinic and isochromatic fringes? (4)

24. a) Based on quantum concepts derive the Planck's radiation formula.

(OR)

  b) (i) Apply Schrodinger wave equation to particle in a one dimensional box and (10) calculate the eigen value and eigen function.

  (ii) List the physical significance of wave function. (4)

25. a) (i) Describe the construction and working of He-Ne laser with energy level (10) diagram.

  (ii) Explain the reconstruction method of hologram. (4)

(OR)

  b) (i) Discuss in detail the classification of optical fibre based on refractive index (10) profile and propagation modes.

  (ii) Explain any one fibre optic sensor. (4)

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