Register Number.....

B.E/ B.TECH. DEGREE EXAMINATIONS: DECEMBER - 2008

2007 Batch - First Semester

U07PH101: PHYSICS-I

Time: Three Hours **Maximum marks: 100**

Answer ALL Questions:-

PART A (20 x 2 = 40 Marks)

1. If the sound intensity at 3m from a source is 0.001 W/sq.m , the sound intensity level at 9m is

   A) 80.45dB B)8.045dB C).8045dB D).08045dB

2. If a nickel rod of 5cm with a density 80Kg/m^3 vibrates in the first overtone, the frequency of the vibration is

   A) 48,000Hz B)96,000Hz C)90,000Hz D)50,000Hz

3. Which among the following statements are correct?

   1) Unit of absorption coefficient is phon
   2) Reverberation time of a hall decreases with increase in the hall absorption
   3)Echelon effect is due to the presence of periodic echoes
   4) Reverberation time depends on the position of the source and observer in a Hall

   A) 2 alone B)2 and 3 C)3 alone D)1 and 4

4. Which of the following is most suitable for use in Piezo electric Ocillator?

   A)Nickel B)$BaTiO_3$ C)Aluminium D)Silicon

5. The effective number of atoms in the unit cell of FCC and BCC is

   A) 4 and 1 B) 4 and 2 C)4 and 3 D)3 and 2

6. What will be the density of BCC Sodium crystal which has a lattice constant 4.92 A^0 and atomic weight 23?

   A)$643x10^2$ Kg/m^3 B) 6430 Kg/m^3 C) $643x10^3$ Kg/m^3 D)$643x10^6$ Kg/m^3

7. Assertion (A): Preparation of a good surface is more significant in Liquid penetrant Testing (LPT)

   Reason (R) : Principle behind the LPT is surface tension of the liquid

   A) Both A and R are true and R is the correct reason for A
   B) Both A and R are true and R is not the correct reason for A
   C) A is true and R is false
   D) A is false and R is true

8. Which among the following statements are correct?

   1) Couplant like Silicone in Ultrasonic testing helps to focus the waves into the specimen
   2) In radiographic testing double wall penetration has highest sensitivity
   3) Objects of any size with regular shape can be tested in Fluoroscopy
   4) Infrared radiations emitted from the object is recorded in thermo gram

   A)1 and 3 B) 1 and 4 C) 2 and 3 D) 1 and 4

9. When the movable mirror of the Michelson's interferometer is moved by 0.03 mm, a shift of 100 circular fringes is observed. The wavelength of the light used is

   A) 6000A^0 a B) 5000A^0 C) 6800A^0 D) 5800A^0

10. The wavelength of the light used in a 1.64 μm thick half wave plate made of calcite is

    A) 5.64 μm B) .564 μm C) 564 μm D) 5640 μm

11. g(0.5L) (HL)^{m} H(0.5L) a stack represents

A)Interference filter B)High pass filter C)Low pass filter D)Interferometer

12. Which among the following statements are not true?

1) Photo elastic bench is a plane polariscope
2) Photo elastic bench is a circular polariscope
3) Isoclinic fringes give the information about the direction of the principal stress
4) Isochromatic fringes give the information about the direction of the principal stress

A) 2 and 3 B) 3 and 4 C)1 and 4 D)1 and 3

13. Sodium has a work function 2.2eV. The threshold wavelength for photo electric effect is

A) 5200A^{0} B) 6000A^{0} C) 5463A^{0} D) 5643A^{0}

14. X- rays of wavelength 1.24 A^{0} is viewed at an angle of 60^{0} to the direction of incidence. The Compton shift produced is

A) 0.012A^{0} B) 0.12A^{0} C) 0.0012A^{0} D) 0.024A^{0}

15. What is the potential inside a potential well , which confine a quantum particle like electron

A) Infinity B)Zero C)230 V D)1000eV

16. If an electron at rest is accelerated through a potential difference 100 V, the wavelength of the electron is

A)) 12.28A^{0} B)) 122.8 A^{0} C)) 1.228A^{0} D)) 0.1228A^{0}

17. Assertion (A): Vibrational energy levels of a molecule are quantized

Reason (R): Transition between vibrational energy levels produces laser emission in He-Ne Laser

A) Both A and R are true and R is the correct reason for A
B) Both A and R are true and R is not the correct reason for A
C) A is true and R is false
D) A is false and R is true

18. Assertion (A) : A hologram does not contain a distinct three dimensional image of the object

Reason (R) : It is only a record of the interference pattern

A) Both A and R are true and R is the correct reason for A
B) Both A and R are true and R is not the correct reason for A
C) A is true and R is false
D) A is false and R is true

19. An optical fiber has core and cladding refractive indices 1.45 and 1.40 respectively. The acceptance angle is given by

A) 28^{0}.22' B) 26^{0}.18' C) 22^{0}.18' D) 20^{0}.22'

20. Match the following:-

Fiber Optical sensor	Principle
Displacement	Interference
Temperature	Pockel's effect
Magnetic field	Micro bending
Electric field	Faraday's effect

A)a-3 b-1 c-4 d-4 B)a-1 b-2 c-3 d-4 C)a-2 b-3 c-1 d-4 D)a-4 b-3 c-1 d-2

PART-B (5 x 12 = 60 Marks)

21. a) i) Explain the factors affecting the acoustics of buildings and their remedies. (9)

ii) State the principle of SONAR. If an ultrasonic source of 0.07 MHz sends down a pulse towards the seabed which returns after 0.65 S, calculate the depth of the sea and the wavelength of pulse. (3)

(OR)

21.b) i) Explain the production of ultrasonic waves by magnetostriction method. (9)

ii) Define the absorption coefficient of sound and its unit. (3)

22.a) i)Determine the co-ordination number and Atomic Packing Fraction for a HCP structure. Show that a hcp structure demands an axial ratio of 1.633. (9)

ii) Explain the pulse echo system of ultrasonic testing. (3)

(OR)

22.b) i) Explain the principle and various steps involved in Liquid penetrant method (9)

ii) Find the Miller indices of the planes with the following intercepts (2 2 ½), (1 1 1) and (1 1 ∞) (3)

23.a) i) Explain in detail the production and analysis of plane, circularly and elliptically polarised light. (9)

ii) What is an anti- reflection coating? State the condition for a film to be anti reflecting? (3)

(OR)

23.b) i) Obtain an expression for fringe width in a wedge shaped thin film. How it is used for testing the Optically plane surface? (9)

ii) What is Birefringence? How this is used to find the stress distribution? (3)

24.a) i) State and explain Einstein's photoelectric equation. How are the different laws of photoelectric Effect explained by this equation? (7)

ii) Calculate the first three permitted energy levels (in eV) of an electron in a box of 1 A^0 width (5)

(OR)

24. b) i) Derive the Schrodinger's time dependent equation for a quantum particle (9)

ii) Write down the salient features of Planck's quantum theory of the black body (3)

25. a) i) What is a gas laser? Explain the construction and working of a He-Ne laser with a sketch (9)

ii) Draw the profiles of the refractive index inside a step index and graded index fiber (3)

(OR)

25. b) i) Explain the working of a fiber optic communication system with the block diagram (9)

(ii) State the requirements of a good quality hetero junction which is used in injection laser (3)

****