Register No: ……

B.E/B.TECH. DEGREE EXAMINATIONS: APRIL / MAY 2011

First Semester

PHY101: ENGINEERING PHYSICS

(Common to all branches)

Time: Three hours **Maximum Marks: 100**

Answer ALL Questions

PART A (10x1 = 10 Marks)

1. Musical notes emitted by two musical instruments are distinguished by

A.Decibel B. Quality C. Hertz D. Loudness

2. Magnetostriction effect produces

A. Elongation of ferro magnetic rod. B. Contraction of ferro magnetic rod.

C .Elongation and contraction of ferro magnetic rod. D. Breakage of rod.

3. The atomic radius for BCC structure in terms of lattice constant is

A. r= a/2√2. B. r= a/2. C. r= √3.a/4. D. r= √3.a/8.

4. Principle of thermography is based on

A. Measurement of thermal emission between defective part and defective free part

B. Measure thermal conductivity.

C. Measurement of resistence.

D. Measure of absorption of heat.

5. The phenomenon of light responsible for the formation of air wedge is

A. Interference. B. Polarisation. C. Differaction. D. Birefringence.

6. Stress- optic law is

A. $n_1-n_2 = C(\sigma_1 - \sigma_2)$. B. $n_2-n_1 = C(\sigma_1 - \sigma_2)$. C. $2\mu t\cos r = n\lambda$. D. $2d \sin\theta = n\lambda$.

7. The number of photo electrons emitted depend on

A. Frequency of incident radiation. B. Colour of incident radiation.

C. Intensity of incident radiation. D. Phase of incident radiation.

8. Schrodinger time dependent wave equation is

A. $E\psi = K\psi$ B. $E\psi=\psi\psi$ C.$E\psi=1$ D. $H\psi=E\psi$

9. Among the following semiconductors which semiconductor can not be used for making laser diode?

A. GaAs B. InP C. Ge D. GaAsP.

10. In the graded index fiber the refractive index between the core and cladding

A. gradually increases. B. gradually decreases

C. remains the same. D. decreases abruptly

PART B (10 x 2 = 20 Marks)

11. What is meant by reverberation time?
12. Find the depth of a submarine if an ultrasonic wave is received after 0.33 sec. from the time of transmission and the velocity of ultrasonic waves in sea water is 1440 m/sec.
13. What is a primitive cell?
14. What are the differences between x -ray radiography and fluoroscopy?
15. What is meant by circularly polarized light?
16. A wave plate is of 12.5μm thickness. The difference in the principal refractive indices is 0.01. Calculate the wave length for which it can act as a quarter wave plate.
17. Explain energy spectrum of a black body.
18. What is the physical significance of a wave function?
19. What are the conditions required for laser action?
20. Give four applications of fiber optic sensors.

PART C (5 x 14 = 70 Marks)

21. a) (i) What is absorption coefficient of a material and explain a method to find absorption coefficient of a material? (7)

(ii) Explain the various factors to be considered in designing an acoustically good hall and give their remedies. (7)

(OR)

b) (i) Explain with a neat diagram, the construction and working of a piezo-electric oscillator for production of ultrasonic waves. (10)

(ii) Write a note on SONAR. (4)

22.a) (i) What are Miller Indices and explain the procedure to be followed for finding Miller Indices of cubic crystals with suitable examples. (7)

(ii) What is packing density and derive the same for simple cubic and BCC. (7)

(OR)

b) (i) Explain with a block diagram, the working of ultrasonic flaw detector and explain the three scan displays used for data presentation. (10)

(ii) Explain the advantages of NDT of materials. (4)

23. a) (i) Describe the construction and working of Michelson Interferometer and explain the various types of fringes formed. (10)

(ii) In a Michelson Interferometer when thin film of refractive index 1.5 is introduced in the path of one of the interfering beams, a shift of 30 fringes is observed in the field of view. If the thickness of the thin film is 1.8μm, calculate the wavelength of the light source used. (4)

(OR)

b) (i) Discuss in detail, the effect of stressed model in a plane polariscope and explain the conditions for isoclinic and isochromatic fringes.

24. a) (i) State and explain Einstein's photoelectric equation. How are the different laws of photoelectric effect explained by this equation? (10)

(ii) Explain degenerate and non-degenerate energy states with examples. (4)

(OR)

b) Define Compton Effect and derive an expression for Compton wavelength for a collision between a photon and an electron.

25.a) (i) Describe the construction and working of He-Ne LASER with necessary energy level diagrams. (10)

(ii) Explain the application of LASER in CD-ROM. (4)

(OR)

b) (i) Derive an expression for acceptance angle and numerical aperture of optical fibers. (8)

(ii) Explain with a block diagram the working of fiber optic communication system. (6)

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