Register Number: ……

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2010

Second Semester

PHY106: APPLIED PHYSICS

(Common to Textile Technology, Fashion Technology & Bio Technology)

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The Fermi energy level acts as a reference level which separates the filled states & vacant states at

   A)100 K B) 0 K C) 0^o D) 273 K

2. Josephson junction is used in

   A) High temperature Superconductor B) Cryotron C) SQUID D) Cooper pair

3. In P-type semiconductors the majority charge carriers are

   A) Protons B) Holes C) Electrons D) Neutrons

4. The negative sign of the Hall coefficient of the given semiconductor indicates that it is a

   A) Defective semiconductor B) Strength of the semiconductor

   C) P-type semiconductor D) N-type semiconductor

5. The product of retentivity and coercivity of a magnetic material is called its

   A) Energy product B) Dielectric strength C) Retention time D) Coerciveness

6. The [Dielectric breakdown voltage /Thickness of dielectric material] is called

   A) Dielectric polarization B) Dielectric strength C) Intrinsic breakdown D) Polarization

7. Ni-Ti (Nickel-Titanium) is a widely used

   A) Metallic glass B) Piezo-electric material C) Ceramic material D) Shape Memory Alloy

8. Carbon nanotube is a cylindrically rolled mesh of

   A) Graphene B) Germanium C) Silicon D) Aluminum compound

9. Ultrasonic waves are sound waves of frequency

   A) Above 20 Hz B) Below 20 K Hz C) 20 Hz to 20,000 Hz D) above 20 Kilo Hz

10. The device that can detect a weak flash of light and estimate the amount of light is called as

    A) Photomultiplier B) Synchrotron C) Cyclotron D) Optical fibre

PART B (10 x 2 = 20 Marks)

11. What is Widemann Franz law?
12. What is Cryotron?

13. What is effective mass of electron?
14. Write any two important points about Fermi energy level
15. What is hysteresis loss?
16. What is Dielectric breakdown?
17. What are the two phases involved in the shape memory effect of shape memory alloys?
18. What is carbon nanotube?
19. What is Phonocardiograph (PCG)?
20. What is nuclear medicine?

PART C (5 x 14 = 70 Marks)

21. (a) Derive an expression for the density of energy states and hence arrive at an expression for fermi energy of electrons in solids at absolute zero.

(OR)

(b) (i) Explain in detail the properties (critical temperature, magnetic field and current) of Superconductors . (7)

(ii) Describe Type-I and Type –II superconductors (7)

22. (a) Derive an expression for carrier concentration of an intrinsic semiconductor.

(OR)

(b) Explain the theory of Hall effect in the case of a P type semiconductor. Using it derive the expression for the experimental determination of Hall coefficient.

23. (a) (i) Describe in detail hysteresis curve of a ferromagnetic material. (6)

(ii) Explain the properties and applications of soft and hard magnetic materials. (8)

(OR)

(b) Define dielectric breakdown and explain in detail Intrinsic, Thermal, Discharge, Electrochemical & Defect breakdown mechanisms.

24. (a) Explain the preparation of metallic glasses by melt spinning technique, its properties and applications.

(OR)

(b) Describe in detail Pulsed Laser deposition and Carbon Arc discharge methods of fabrication of carbon nanotubes.

25. (a) Explain the different types of ultrasonic scanning and displays for medical diagnosis.

(OR)

(b) (i) Describe the construction and working of Geiger Muller counter. (7)

(ii) Explain the method of obtaining nuclear image of an organ of our body using Positron Emission Tomography (PET) camera. (7)

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