KUMARAGURU
college of technology
character is life

Register Number:…….

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Second Semester

PHY106: APPLIED PHYSICS

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

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. If a superconducting material is subjected to critical field, the material becomes

   a) Superconducting state
   b) Semiconducting state
   c) Normal conducting state
   d) Remains uninfluenced

2. The expression for electrical conductivity is

   a) $\sigma = ne^2m / \tau$
   b) $\sigma = nm^2e / \tau$
   c) $\sigma = ne^2\tau / m$
   d) $\sigma = m \tau / me^2$

3. At 0 K semiconductors behaves as perfect

   a) Conductors
   b) Semi conductors
   c) Insulators
   d) Magnets

4. Silicon doped with gallium is

   a) Intrinsic semi conductor
   b) p-type semi conductor
   c) p-n junction diode
   d) n-type semiconductor

5. In diamagnetic materials the value of susceptibility is

   a) Positive value
   b) Negative value
   c) Infinite
   d) Zero

6. The electronic polarizability α_e of a monoatomic gas atom is

   a) $4\pi H\varepsilon_0$
   b) $4\pi\varepsilon_0 R$
   c) $4\pi\varepsilon_0 R^3$
   d) $4\pi\varepsilon_0 R^2$

7. The two structures involved in shape memory alloy are

a) Pseudo, Peralite
b) Peralite, Gerlite
c) Martensite, Austenite
d) Maximite, Amberlite

8. The size of the nanomaterial is the order of

a) 1-10nm
b) 1-100nm
c) 0.1-1nm
d) 0.01-1nm

9. In ultrasound scanning of human body A scan is

a) Brightness scan display
b) Fluoroscopy scan display
c) Amplitude scan display
d) Aligned scan display

10. Technetium 99m emits only

a) Beta rays only
b) Gamma rays only
c) Alpha rays only
d) Both B& C

PART B (10 x 2 = 20 Marks)

11. Mention any two drawbacks of classical free electron theory.
12. Explain about SQUIDS
13. What is effective mass of electron?
14. Compare n and p type semiconductors.
15. What are hard magnetic materials?
16. What are ferroelectric materials?
17. What is pseudo elasticity?
18. What is ball milling?
19. What is phonocardiography?
20. What is Positron camera?

PART C (5 x 14 = 70 Marks)

21. a) Based on Drude and Lorentz theory derive expressions for electrical and thermal conductivity and hence derive Wiedemann-Franz law.

(OR)

b) (i) What is superconductivity? Discuss the Meissner effect and isotope effect in superconductors. (7)

(ii) Write a note on high temperature superconductors and also explain type I and type II superconductors with suitable examples. (7)

22. a) (i) Derive an expression for carrier concentration of an intrinsic semiconductor. (10)

(ii) Discuss the variation of Fermi level with temperature. (4)

(OR)

b) (i) What is Hall effect? Derive an expression for Hall coefficient. Describe an experimental setup for the measurement of Hall coefficient.

23. a) (i) Explain the Weiss theory of paramagnetism and obtain an expression for paramagnetic susceptibility. (7)

(ii) Explain in detail domain theory of ferromagnetism. (7)

(OR)

b) (i) Explain electronic and ionic polarizations involved in a dielectric material. (7)

(ii) Discuss in detail the various dielectric breakdown mechanisms. (7)

24. a) (i) What are metallic glasses? How are they prepared? Explain their properties and applications.

(OR)

b) (i) Explain with necessary diagrams about the Plasma arcing and Sol-gel method of nano materials synthesis.

25. a) (i) Write a note on ultrasound picture of human body. (7)

(ii) Briefly explain the different modes of ultrasonic scanning with suitable diagrams. (7)

(OR)

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

(ii) Explain the method of obtaining nuclear image of an organ of our body using gamma camera (7)

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