

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 41024**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Second Semester

Computer Science and Engineering

14UPH204 - APPLIED PHYSICS

(Common to Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Information Technology)

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 1 = 10 Marks)

- The average distance travelled by the electron between any two successive collisions is known as
  - relaxation time
  - period
  - mean free path
  - drift velocity
- If the mobility of electrons in a metal increases, the resistivity
  - decreases
  - increases
  - remains constant
  - both a and b
- At very high temperatures, the n type semiconductor behaves like an
  - elemental semiconductor
  - intrinsic semiconductor
  - extrinsic semiconductor
  - insulator
- Intrinsic concentration of charge carriers in a semiconductor varies as
  - T
  - $T^2$
  - $T^{3/2}$
  - 1/T

5. The magnetic recording tapes are most commonly made from  
 (a) silver nitrate            (b) austenite            (c) silicon-iron            (d) ferric oxide
6. The superconducting transition temperature of mercury is  
 (a) 1 K            (b) 1.14 K            (c) 4.12 K            (d) 2.14 K
7. In a dielectric, the polarization is \_\_\_\_\_  
 (a) linear function of applied field            (b) square function of applied field  
 (c) exponential function of applied field            (d) logarithmic function of applied field
8. For a given dielectric, as the temperature increases, the ionic polarizability  
 (a) increases            (b) decreases            (c) remains unaltered            (d) zero
9. Pseudo-elasticity occurs in \_\_\_\_\_  
 (a) metallic glasses            (b) shape memory alloys  
 (c) quantum wires            (d) nanotubes
10. Metallic glasses have \_\_\_\_\_ thermal conductivity than that of crystals  
 (a) high            (b) lower            (c) medium            (d) none

PART - B (5 x 2 = 10 Marks)

11. Interpret the variation of Fermi function with temperature.
12. Define Hall effect.
13. Distinguish between hard and soft magnetic materials.
14. What are the factors that affects dielectric loss?
15. What is shape memory alloy?

PART - C (5 x 16 = 80 Marks)

16. (a) Define thermal and electrical conductivity of a metal and deduce a mathematical expression for electrical and thermal conductivity of a conducting material. (16)

Or

- (b) Deduce the Wiedemann - Frantz law from the expression of electrical and thermal conductivity of metals. (16)

17. (a) Derive the mathematical expression for the density of electrons in the conduction band and holes in valence band of an intrinsic semiconductor. (16)

Or

- (b) Derive an expression for the Hall coefficient in terms of Hall voltage and further explain how the mobility of the charge carriers can be evaluated by knowing the conductivity. (16)
18. (a) What are the various types of magnetic materials? With necessary sketches explain the domain theory of ferromagnetism. (16)

Or

- (b) List out the important properties of superconducting materials and explain them. (16)
19. (a) Explain the mechanism involved in twisted nematic crystal display devices and list out their applications. (16)

Or

- (b) Define internal field? Obtain an expression for internal field and deduce the Clausius-Mosotti equation for elemental solid dielectrics. (16)
20. (a) What are metallic glasses? How they are prepared? Explain their properties and applications. (16)

Or

- (b) Explain how a nanomaterial is synthesized by chemical vapour deposition technique. (16)

---

