KUMARAGURU
college of technology
character is life

Register Number: …...……….

B.TECH DEGREE EXAMINATIONS: DEC 2014

(Regulation 2013)

Second Semester

BIOTECHNOLOGY

U13PHT206: Applied Physics

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The thermal conductivity of an insulator

    a) $K_{total} = K_{phonons}$
    b) $K_{total} = K_{electrons} + K_{phonons}$
    c) $K_{total} = K_{electrons}$
    d) $K_{total} = K_{phonons} + K_{photons}$

2. A normal metal converted into a superconductor at a temperature known as …………

3. The semiconductor having negative Hall coefficient is

    a) P- type
    b) PN type
    c) N-type
    d) PIN type

4. The valance electron for silicon is ……………..

5. Space charge polarization occurs at a frequency

    a) 10^{15} Hz
    b) 10^{13} Hz
    c) 10^{6} Hz
    d) 10^{2} Hz

6. The hysteresis curve exhibited by ferrites is in the form of ……………..

7. Example of zero dimension nanomaterial is

    a) Quantum well
    b) Quantum wire
    c) Quantum dots
    d) Carbon nanotube

8. …………….SMA is used for biomedical applications

9. Sound wave having frequency above 20 kHz are known as

    a) Infrasonic
    b) Audiable range
    c) Ultrasonic
    d) Infra red

10. …………….. are due to turbulent flow of blood in the heart and large blood vessels.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. State Wiedemann Franz law.

12. What is Messiner effect?

13. Mention any two applications of Hall effect?

14. The intrinsic carrier density is 1.5×10^{16} /m^3. If the electron and hole mobilities are 0.13 and 0.05 $m^2V^{-1}s^{-1}$ then calculate the electrical conductivity. (charge of electron = 1.6×10^{-19} C)

15. What are soft magnetic materials? Mention anyone of its application.

16. What are ferroelectric materials? Give an example.

17. What is two way shape memory effect?

18. What is fullerene?

19. What are the uses of phonocardiography?

20. Can you get complete ultrasonic image of brain? Justify your answer.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21.   What are metallic glasses? Explain how metallic glasses are manufactured. Give examples for types of metallic glasses. Also mention any two properties and applications of metallic glasses.

22. a) (i) Deduce an expression for electrical conductivity of a metal.   (8)

      (ii) Distinguish between type-I and type-II superconductors.   (6)

(OR)

  b) (i) Explain the following with a neat diagram   (8)

      (A) Cryotron   (B) Magnetic levitation

      (ii) State the postulates of Drude Lorentz classical free electron theory.   (6)

23. a)   What are extrinsic semiconductor? Deduce an expression for carrier concentration of electron in N-type semiconductor. Also discuss about the variation of Fermi level with temperature and concentration of donor atoms.

(OR)

b)   What is Hall effect? Describe an experiment to find the concentration of charge carriers in N-type semiconductors using Hall effect.

24.   a)   (i)   What is hysteresis? Explain hysteresis curve on the basis of domain theory.   (10)

          (ii)   Mention any four properties of ferroelectric materials.   (4)

(OR)

    b)   (i)   What is dielectric breakdown? List out the important types of dielectric (10) breakdown. Explain any two dielectric breakdown mechanism.

          (ii)   Mention any four properties of ferromagnetic materials.   (4)

25.   a)   Explain the different modes of display of ultrasonic images of different parts of the human body and mention their applications.

(OR)

    b)   Explain the method of obtaining nuclear image of an organ of our body using gamma camera.

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