Register Number: ………………….

B.E. DEGREE EXAMINATIONS: NOV / DEC 2010

Second Semester

AERONAUTICAL ENGINEERING

U07PH203: Physics II

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Dislocations are

    A) line defects   B) planar defects   C) chemical defects   D) point defects

2. Cold work is done on metals

    A) above thermal critical range   B) at temperature below $0\ ^{0}C$

    C) after slightly warming up the metal in furnace   D) below thermal critical range

3. At 0K semiconductor act as a

    A) super conductor   B) good conductor   C) insulator   D) same as a semiconductor

4. The density of charge carriers in a pure semiconductor is proportional to

    A) T B) T^2 C) $T^{3/2}$ D) T^3

5. Materials which lag of permanent magnetic dipoles are called

    A) ferro magnetic   B) diamagnetic   C) semi magnetic   D) none of the above

6. Dielectric loss in ferrite is

    A) very high   B) very low   C) zero   D) none of these

7. Boron rods in a nuclear reactor are used to

    A) absorb excess neutrons   B) absorb alpha particles

    C) slow down the reaction   D) speed up reaction

8. The nuclei suitable for fusion process are

     A) heavy nuclei   B) any nuclei   C) light nuclei   D) both A&B

9. Soft super conductors can be observed from

    A) Meissner effect   B) BCS theory   C) incomplete Meissner effect   D) isotope effect

10. Super conductors are normally used for

    A) reducing I^2R loss   B) generating very strong magnetic field.

    C) generating electrostatic field   D) generating current

PART B (10 x 2 = 20 Marks)

11. Define burgers vector.

12. What is creep?

13. How the Fermi level varies with temperature in the case of P type and N type semiconductor?
14. If the intrinsic carrier density at room temperature in GE is 2.37×10^{19} /m^3. If the electron and hole mobilities are 0.38 and 0.18 m^2 v^{-1} s^{-1} respectively. Calculate electrical conductivity.
15. What are dielectrics?
16. Define magnetic susceptibility?
17. Distinguish between fission and fusion
18. What are breeder reactors?
19. Calculate the critical magnetic field for a wire of lead having a dia 1mm at 4.2K. The critical temperature for lead is 7.18K and $H_0 = 6.5 \times 104$ A/m.
20. What are metallic glasses?

PART C (5 x 14 = 70 Marks)

21. (a) (i) Distinguish between brittle fracture and ductile fracture. (7)
    (ii) Explain Griffith's theory of brittle fracture. (7)
(OR)
  (b) (i) Give an account on various factor affecting mechanical properties of a material. (7)
    (ii) What are the classifications of crystal imperfections, and explain in detail of point defects? (7)

22. (a) (i) Derive an expression for the density of states. (7)
    (ii) Explain how Fermi level varies with temperature and impurity concentration in P type and N-type semiconductor. (7)
(OR)
  (b) (i) Derive the relation for carrier concentration for in N-type semiconductor. (7)
    (ii) Derive the expression for Hall coefficient and describe an experimental setup to the measurement of Hall coefficient. (7)

23. (a) (i) Explain domain theory of Ferro magnetism. (7)
    (ii) Distinguish between hard and soft magnetic materials. (7)
(OR)
  (b) (i) Explain ionic polarization mechanism in dielectrics. (7)
    (ii) Explain various dielectric breakdown mechanisms. (7)

24. (a) (i) Explain uncontrolled and controlled chain reactions with examples. (7)
    (ii) Explain construction and working of bubble champers? (7)
(OR)
  (b) (i) Derive Einstein mass energy relation. (7)
    (ii) What are the properties of nuclear forces? (7)

25. (a) (i) Explain in detail the properties of super conductors? (7)
    (ii) Write short notes on Magnetic Levitation and SQUIDS. (7)
(OR)
  (b) (i) Explain the characteristics of shape memory alloys and list out their applications. (7)
    (ii) Explain how the nano phase material's physical properties are varied with geometry.(7)

****