**Test No. 7 Physics (Chapter 17) Class: Second Year Total Marks=40**

**Name of the Student: _____**

**Question No. 1. Encircle the correct option. (20)**

i. The substances which break after plastic limit, are called
(a) ductile substances (b) hard substances (c) soft substances (d) brittles substances

ii. Which of the following is an example of ductile substance
(a) Lead (b) Copper (c) Glass (d) Lead & Copper

iii. The materials whose resistivity becomes zero below a certain temperature are called
(a) good conductors (b) super conductors (c) bad conductors (d) insulators

iv. The basic building block of the crystal lattice is called
(a) a molecule (b) an atom (c) a unit cell (d) an ion

v. A pure semiconductor material is called
(a) Intrinsic semiconductor (b) Extrinsic semiconductor (c) insulator (d) conductor

vi. The materials in which there is a large forbidden gap between valence band and conduction band, are called
(a) insulators (b) conductors (c) semiconductors (d) superconductors

vii. In p-type semiconductors ---------- are responsible for electrical conduction
(a) electrons (b) holes (c) both electrons and holes (d) none of these

viii. Which one of the following is not semiconductor?
(a) copper (b) silicon (c) germanium (d) gallium arsenide

ix. S.I unit of stress is same as that of
(a) momentum (b) pressure (c) force (d) length

x. A stress which changes the shape of the body is called
(a) tensile stress (b) volumetric stress (c) shear stress (d) compression stress

xi. The forbidden energy gap of an insulator is of the order of
(a) 1 eV (b) 5 eV (c) 10 eV (d) several eV

xii. A 0 K, a piece of Ge or Si is a
(a) perfect conductor (b) perfect insulator (c) semiconductor (d) none of these

xiii. Which one of the following substance cannot be used to form a p-type substance?
(a) indium (b) boron (c) gallium (d) antimony

xiv. n-type semiconductor material is
(a) positively charged (b) negatively charged (c) sometime +vly and sometime -vly charged (d) neutral

xv. In p-type material, the minority charge carriers are
(a) holes (b) electrons (c) positive ions (d) negative ions

xvi. Solids having long chain carbon molecules are called
(a) polymeric solids (b) crystalline solids (c) amorphous solids (d) none of these

xvii. The value of the resistivity of the semiconductor is of the order of
(a) $10^4$ Ω m (b) $10^6$ Ω m (c) $10^7$ Ω m (d) $10^7$ Ω m

xviii. Yttrium barium copper oxide ($YBa_2Cu_3.O_7$) becomes superconductor at
(a) 1.18 K (b) 4.2 K (c) 163 K (d) 225 K

xix. Special alloy, Alnico V is a
(a) paramagnetic material (b) soft magnetic material (c) hard magnetic material (d) diamagnetic material

xx. Hysteresis loop is formed with
(a) paramagnetic material (b) diamagnetic material (c) ferromagnetic material (d) semiconductor material

**Question No. 2: Write short answers of any six of the following questions. 2 x 6=12**

i. What is the difference between ductile and brittle substances? Give example of each.

ii. Distinguish between p-type and n-type substances?

iii. Discuss briefly the mechanism of electrical conduction by holes and electron in a pure semi-conductor element.

iv. What is meant by hysteresis lows? How is it used in the construction of a transformer?

v. What is meant para, dia and ferromagnetic substances? Give example of each.

vi. Distinguish between unit cell and crystal lattice.

vii. Distinguish among crystalline, amorphous and polymeric solids.

viii. Define stress and strain. What are their SI units?

**Q. No. 3 a)** Explain energy band theory? Also differentiate among conductors, insulators and semiconductors on the basis of this theory. **(2+3)**

**b)** A 1.0 m long copper wire is subjected to stretching force and its length increases by 20 cm. Calculate the tensile strain and the percent elongation which the wire undergoes. **(3)**

**OR**

**Q.No. 4 a)** Describe the concept of stain energy in a deformed material and derive a formula for it. **(5)**

**(b)** What stress would cause a wire to increase in length by 0.01% if Young's modulus of the wire is $12x10^{10}$ Pa. What force would produce this stress if the diameter of the wire is 0.56 mm? **(3)**