UNIT 21 PHYSICS OF SOLID

1. The property of a body by virtue of which it tends to regain its original size and shape when the applied force is removed is called
   (a) Elasticity
   (b) Plasticity
   (c) Rigidity
   (d) Compressibility
2. Substances that can be stretched to cause large strains are called
   (a) Brittle
   (b) Ductile
   (c) Plastic
   (d) Elastomer
3. If the load is increased beyond the point, the strain increases rapidly for even a small change in the stress.
   (a) Elastic point
   (b) Yield point
   (c) Plastic point
   (d) Fracture point

4. The reciprocal of the bulk modulus is called
   (a) Compressibility
   (c) Volume stress
   (c) Modulus of rigidity
   (d) Volume strain
5. Which of the following statements is/are wrong?
   i. Hollow shaft is much stronger than a solid of the same length and mass.
   ii. The reciprocal of the bulk modulus of elasticity is called compressibility.
   iii. It is difficult to twist a long rod as compared to a small rod.
   (a) III only
   (b) I only
   (c) II and III
   (d) I and II
6. Metals are good conductors of heat and electricity. This property is conferred by
   (a) Covalent
   (b) Ionic
   (c) Metallic
   (d) Hydrogen
7. For a metallic crystal, the delocalized electrons occupied band is:
   (a) Conduction band
   (b) Valence band
   (c) Conduction and valence bands
   (d) There are no delocalized electrons
8. The semiconductors have resistivity
   (a) Between the conductor and the insulator
   (b) More than insulators
   (c) Less than conductors
   (d) Depending upon the semiconductor material property.

9. A ferromagnetic substance becomes a permanent magnet when it 1s placed m a magnetic field because
   (a) All the domains get oriented in the direction of the magnetic field.
   (b) All the domains get oriented in the direction opposite to the direction of the magnetic field.
   (c) Domains get oriented randomly.
   (d) Domains are not affected by the magnetic field.
10. Identify methods to demagnetize a ferromagnet.
    (a) By cooling, heating, or submerging in water
    (b) By heating, hammering, and spinning it in an external magnetic field
    (c) By hammering, heating, and rubbing with a cloth
    (d) By cooling, submerging in water, or rubbing with a cloth

UNIT 21 PHYSICS OF SOLID

EXAM PRACTICE MCQs

1 Which of the following statement is correct?
(a) The stress is the pressure per unit area.
(b) The strain is expressed in mm.
(c) Hook's law holds good up to the breaking point.
(d) Stress is directly proportional to strain within the elastic limit.

2 Modulus of rigidity is the ratio of
(a) stress to strain
(b) tensile stress to tensile strain
(c) compressive stress to compressive strain
(d) shear stress to shear strain

3 The ratio of the largest load in a test to the original cross-sectional area of the test piece is called
(a) elastic limit
(b) yield stress
(c) breaking stress
(d) ultimate stress

4 The deformation per unit length is called
(a) tensile stress
(b) compressive stress
(c) shear stress
(d) strain

5 The ratio of change in volume to the original volume is called
(a) linear strain
(b) lateral strain
(c) volumetric strain
(d) Poisson's ratio

6 The elasticity is the property of a material that enables it to
(a) Regain its original shape after deformation when the external forces are removed
(b) drawn into wires by the application of a tensile force
(c) Resist fracture due to high-impact loads
(d) retain deformation produced under load permanently

7 The plasticity is the property of a material that enables it to
(a) Regain its original shape after deformation when the external forces are removed
(b) drawn into wires by the application of a tensile force
(c) Resist fracture due to high-impact loads
(d) retain deformation produced under load permanently

8 The unit of modulus of elasticity is same as that of
(a) stress, strain, and pressure
(b) stress, force, and modulus of rigidity
(c) strain, force, and pressure
(d) stress, pressure, and modulus of rigidity

9 The stress at which the extension of the material takes place more quickly, as compared to the increase in load, is called
(a) elastic limit
(b) yield point
(c) ultimate point
(d) breaking point

10 Maximum elasticity is in
(a) Rubber **(b) steel**
(c) Silver (d) Glass

11 The breaking stress of a wire depends upon
(a) material of wire
(b) length of wire
(c) radius of wire
(d) shape of cross-section

12. Two wires A and B are stretched by the same load. If the area of the cross-section of wire 'A' is double that of 'B', then the stress on 'B' is
(a) Equal to that on A **(b) Twice that on A**
(c) Half that on A (d) Four times that of A

13 Which law describes the linear relationship between stress and strain within the elastic limit of a material?
(a) Newton's Law **(b) Hooke's Law**
(c) Pascal's Law (d) Archimedes' Principle

14 Which term describes the ratio of volumetric stress to volumetric strain within a material?
(a) Shear modulus **(b) Bulk modulus**
(c) Young's modulus (d) Poisson's ratio

15 For elements having an energy gap more than 5 eV, act as:
(a) Semiconductors **(b) Insulators**
(c) Superconductors (d) Conductors

16 Forbidden energy gap in an atom is the gap between the:
(a) 2nd and valence band
(b) valence band and conduction band
(c) 1st and 2nd band
(d) 1st and valence band

17 In terms of energy bands, insulators have:
(a) Full conduction band (b) Tiny energy gap
(c) Full valence band (d) Moderate energy gap

18 The energy which any electron possesses at 0 K is:
(a) Fermi level (b) Valence energy
(c) Exergy (d) Conduction energy

19 The structure-sensitive property of a superconductor is
(a) critical current density (b) critical magnetic field
(c) transition temperature (d) None of the above

20 A superconducting material, when placed in a magnetic field, will:
(a) Attract the magnetic field towards its centre
(b) repel all the magnetic lines of force passing through it
(c) attract the magnetic field but transfer it into a concentrated zone
(d) not influence the magnetic field

21 The best definition of a superconductor is
(a) It is a material showing perfect conductivity and the Meissner effect below a critical temperature
(b) It is a conductor having zero resistance
(c) It is a perfect conductor with the highest diamagnetic susceptibility
(d) It is a perfect conductor, but becomes resistive when the current density through it exceeds a critical value

22 The energy gap of a superconductor
(a) is independent of temperature
(b) increases with temperature
(c) is maximum at the critical temperature
(d) is minimum at the critical temperature

23 Which of the following conductors has the highest critical temperature?
(a) Aluminum (b) Zinc
(c) Molybdenum **(d) Tin**

24 Superconductors are discovered in the year
(a) 1900 (b) 1991
(c) 1911 (d) 1905

25 The minimum amount of current passed through the body of a superconductor in order to destroy the Superconductivity is called
(a) Induced current **(b) Critical current**
(c) Eddy current (d) Hall current

26 The magnetic lines of force cannot penetrate the body of a superconductor, a phenomenon is known as
(c) Isotopic effect (c) BCS theory
(c) Meissner effect (c) Lorentz theory

27 The shifting of electrons in superconductors is prevented by _____
(a) Quantum effect (b) Threshold energy level
(c) Energy barrier (d) Orbitals

28 The normal metal passes into the superconducting state at _____
(a) High temperature (b) Low temperature
(c) Critical temperature (d) zero temperature

29 Type-I superconductors can produce a magnetic field of the order of.....
(a) 100 Tesla (b) 10 Tesla
(c) 5 Tesla (d) 0.1 Tesla

30 The Meissner effect is strictly followed by
(a) diamagnetic material
(b) ferromagnetic material
(c) superconducting material
(d) paramagnetic material