CPET-2021
MATERIAL SCIENCE
Set-1

1. The crystal structure of any material is studied by

(A) X-ray diffraction (B) Optical microscope

(C) Spectrophotometer (D) Hall effect studies

2. Body centered cubic structure has an atomic packing factor equal to

(A) 0.74 (B) 0.68 (C) 0.52 (D) < 0.52

3. Which of the following crystal structure has the highest atomic packing factor?

(A) SC (B) BCC (C) Tetragonal (D) FCC

4. Which of the following is an amorphous material?

(A) Brass (B) Glass (C) Gold (D) Copper

5. The co-ordination number of BCC crystal structure is

(A) 6 (B) 8 (C) 12 (D) 14

6. Which of the following property makes the copper an electrical conductor?

(A) Ductility (B) Low resistance (C) Corrosion resistance (D) FCC structure

7. Ductility of a metal means

(A) It can be drawn into sheets

(B) It can undergo elastic deformation under tensile load

(C) It undergoes plastic deformation under tensile load

(D) All of the above

8. Ceramics having nuclear applications can be used as

(A) moderators (B) controls (C) Both A and B (D) None of these

9. Biosensors are used in

(A) medical field (B) agricultural field (C) pollution monitoring (D) all of these

10. Favourable condition for electro-deposition is

(A) low current density (B) high temperature (C) high viscosity (D) All of these

11. In physico-chemical processes, which factors affect reduction method?

(A) Size of particles (B) Shape of materials (C) Reducing agent (D) All of these

12. What is the by-product formed by the condensation of methyl alcohol and acetic acid to form ester?

(A) Water (B) Hydrogen (C) Oxygen (D) None of these

13. Which type of materials is used as bridges between human tissues and metals?

(A) Polymeric biomaterials (B) Ceramic biomaterials

(C) Metallic biomaterials (D) All of these

14. Which type of microscope is used to determine particle size between (10 to 0.001 μm)?

(A) Optical microscope (B) Electron microscope

(C) Both (A) and (B) (D) None of the above

15. Which one of the following is the best heat and corrosion resistant material?

(A) Metals (B) Polymers (C) Ceramics (D) none of these

16. Which type of materials expand and contract in response to an applied electric field?

(A) Piezoelectric (B) Pyroelectric (C) Biomaterials (D) Nanomaterials

-17. The elastic stress strain behaviour of rubber is

(A) linear (B) nonlinear (C) magnetic (D) none of these

18. Which among the following is the characteristics of polymers?

(A) High tensile strength (B) High coefficient of friction

(C) Low density (D) All of these

19. The weight percentage of carbon present in mild steels is

(A) 0.008 to 0.3 (B) 10 to 20 (C) 0.8 to 2.11 (D) None of these

20. Maximum surface hardening is achieved by

(A) refluxing (B) carburizing (C) flame hardening (D) nitriding

21. The window of aircraft is made of

(A) PMMA (B) PVC (C) PVDF (D) None of these

22. Which of the following material is used first by the early human?

(A) Iron (B) Bronze (C) Rock (D) Silver

23. Which of the following is not the essential component of Material Science?

(A) Properties (B) Structure (C) Performance (D) Cost

24. Which of the following possesses the strong and ductile properties?

(A) Ceramics (B) Polymers (C) Semiconductors (D) Metals

25. Which of the following is a renewable source of energy?

(A) Solar energy (B) Nuclear energy (C) Fossil fuel energy (D) None of these

26. Which of the following is not a metal?

(A) Sulphur (B) Phosphorous (C) Nitrogen (D) None of these

27. Which of the following is a pure element?

(A)Ceramics (B) Glass (C) Cement (D) Sodium

28. The valence of the element A in the oxide AO_2 is

(A) 2 (B) 4 (C) 6 (D) 8

29. Which of the following is not a radioactive substance?

(A) Uranium (B) Francium (C) Tritium (D) Zirconium

30. The pH value of base solution is

(A) > 7 (B) < 7 (C) 7 (D) none of these

31. Blue litmus paper turns red when immersed in a solution which is

(A) acidic (B) base (C) salt (D) none of these

32. Which of the following gas has the highest rate of diffusion?

(A) CO_2 (B) O_2 (C) N_2 (D) NH_3

33. Which of the following is the example of emulsion?

(A) Water (B) Air (C) Milk (D) None of these

34. Air is a

(A) compound (B) mixture (C) element (D) solution

35. The atoms of elements having same atomic number but different mass number are called

(A) isotopes (B) isobars (C) isotones (D) isomers

36 Ferroelectrics are materials with

(a) irreversible magnetization

(b) reversible magnetization,

(c) irreversible polarization

(d) reversible polarization

37. The structure of ethylene is

(A)Linear (B) Octahedral (C) Tetrahedral (D) Planar Triangular

38. Which of the following is the strongest reducing agent?

(A) Mg (B) Al (C) Na (D) Li

39. Which of the following is a mixture?

(A) Distilled water (B) LPG (C) Gasoline (D) Both (B) and (C)

40. Diamond is

(A) an element (B) a compound (C) a mixture (D) a gaseous matter

41. The most abundant metal in the crust of the earth is

(A) iron (B) gold (C) aluminium (D) silver

42. Which of the following conducts electricity?

(A) Silica (B) Hydrogen chloride (C) Graphite (D) Diamond

43. Which of the following is true for ionic compound?

(A) Conduct electricity when dissolved in water

(B) Conduct electricity in solid state

(C) Conduct electricity in gaseous state

(D) None of the above

44. The ionic compound has

(A) High melting and boiling points (B) Low melting and boiling points

(C) Weak inter-atomic forces (D) None of these

45. What is the phase fraction of alloys when it is in one phase?

(A)30% (B) 50% (C) 70% (D) 100%

46. How many components are present in a binary phase system?

(A) 3 (B) 2 (C) 1 (D) 4

47. The material which changes colour due to temperature difference is called

- (A) photochromic (B) thermochromic

(C) photovoltaic (D) liquid crystral

48. If a material generates electricity due to deformation, it is called

(A) photochromic (B) photovoltaic

(C) piezoelectric (D) liquid crystal

49. The liquid with orientationally order and anisotropic properties is known as

(A) liquid crystals (B) plasma (C) quasicrystal (D) polymer

50. Which structure metallic glasses exhibit?

(A) FCC (B) BCC (C) tetragonal (D) amorphous

51. The numbers of atoms present in a FCC unit cell is

(A) 4 (B) 1 (C) 6 (D) 2

52. The coordination number of an ion placed at octahedral centre is

(A) 8 (B) 3 (C) 6 (D) 4

53. Which of the followings is a softest phase of steel?

(A) Austenite (B) Cementite (C) Ferrite (D) Pearlite

54. The expression for Helmholtz free energy is

(A) G=H – TS (B) H = G+TS (C) F= U – TS (D) None of these

55. Entropy of a system depends on the

(A) Bond energy (B) External energy

(C) Randomness of atoms (D) Vander Waals force

56. A semiconductor diode consists of

(A) the junction of n and p-type semiconductor

(B) the junction of two p-type semiconductor

(C) the junction of two n-type semiconductor

(D) none

57. Electron sea exists in

(A) metallicbonded crystal (B) covalent bonded crystal

(C) Van der Waals bonded crystal (D) Ionic bonded crystal

58. Which one of the following is a weak bond?

(A) Ionic bond (B) Van der Waals bond

(C) Covalent bond (D) Metallic bond

59. The material strongly attracted by the magnetic field is known as

(A) paramagnetic (B) diamagnetic

(C) ferromagnetic (D) superconducting

60. The interactions that holds the molecules together in a polar molecular solid is

(A) dipole-dipole interactions (B) metallic bonding

(C) hydrogen bonding (D) none of these

61. An atom located at the body center of a cubic unit cell is shared by

(A) 2 adjacent unit cells (B) 4 adjacent unit cells

(C) 6 adjacent unit cells (D) none of the adjacent unit cells

62. The Miller indices for the crystal plane intersecting at 4, 1, 2 is

(A) (233) (B) (142) (C) (214) (D) (412)

63. The process of incorporation of impurity into the semiconductors to enhance its conductivity is known as

(A) doping (B) sintering

(C) calcinating (D) none of these

64. The electrical conductivity of semiconductor increases with increasing

(A) mass (B) pressure (C) density (D) temperature

65. Which materials possess remnant magnetization?

(A) Ferroelectric (B) Polymer (C) Ferromagnetic (D) None of these

66. Which among the following is a paramagnetic material?

(A) Iron (B) Cobalt (C) Nickel (D) Aluminum

67. Ferromagnetic substance when heated beyond certain critical temperature change to

(A) diamagnetic (B) paramagnetic (C) antiferromagnetic (D) none of these

68. The property of a substance to offer no resistance to the flow of electricity at a particular temperature is known as

(A) magnetism (B) doping (C) superconductivity (D) none of these

69. London forces present in

(A) Polar molecular solids (B) non-polar molecular solids

(C) hydrogen bonded molecular solids (D) none of these

70. Which of the following is a network solid?

(A)H_2O (B) CS_2 (C) KF (D) Diamond

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