

CLASS XII

SAMPLE PAPER

CHEMISTRY

Based on the syllabus of CET-CHD, AIEEE, AIPMT, AFMC, IIT & other competitive examinations.

Time : 70 minutes

Maximum Marks : 120

- To get n-type doped semiconductor, the impurity to be added to silicon should have the following number of valence electrons ?
(A) 2 (B) 5
(C) 3 (D) 1
- Which of the following would you consider to be the best leaving group of those listed ?
(A) hydroxide ion (B) fluoride ion
(C) ethoxide ion (D) tosylate ion
- Which sequence below *correctly* describes the nucleophilicities of the nucleophiles listed ?
(A) $\text{HO}^- < \text{H}_2\text{O}$ (B) $\text{Cl}^- < \text{Br}^-$
(C) $\text{I}^- < \text{Cl}^-$ (D) $\text{HS}^- < \text{HO}^-$
- The mole fraction of solute in one molal aqueous solution is ?
(A) 0.009 (B) 0.018
(C) 0.027 (D) 0.036
- 96500 C electricity is passed through CuSO_4 . The amount of copper precipitated is
(A) 0.5 mole (B) 0.25 mole
(C) 1.0 mole (D) 2.00 mole
- Reaction between excess of $\text{CH}_3\text{CH}_2\text{OH}$ and H_2SO_4 at 140°C gives
(A) $\text{CH}_3\text{CH}_2\text{HSO}_4$ (B) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
(C) CH_3OH (D) C_2H_4
- An example of micelle is
(A) Sodium stearate (B) Gold Sol.
(C) Solution of NaCl (D) Ruby glass
- In the manufacture of urea from ammonia and carbon dioxide the first product of the reaction is

- (A) Ammonium carbonate (B) Ammonium hydroxide
(C) Ammonium carbamate (D) Ammonium formate

9. The basic strength of amines follows the order

- (A) $1^\circ > 2^\circ > 3^\circ > \text{NH}_3$ (B) $\text{NH}_3 > 3^\circ > 2^\circ > 1^\circ$
(C) $2^\circ > 1^\circ > 3^\circ > \text{NH}_3$ (D) $\text{NH}_3 > 1^\circ > 2^\circ > 3^\circ$

10. Nitromethane reacts with chlorine in the presence of base to yield

- (A) Chloromethane (B) Nitrosyl chloride
(C) Chloroform (D) Chloropicrin

11. Adsorption due to strong chemical force is called

- (A) Chemisorption (B) Physiosorption
(C) reversible adsorption (D) Both b and c

12. Oxygen and ozone are:

- (A) Isotopes (B) Isomers
(C) Isobars (D) Allotropes

13. Enzymes which act as catalysts in biochemical reactions are chemically

- (A) Carbohydrates (B) Proteins
(C) Nucleic acids (D) Transport agents

14. Of the following hydrides which is the strongest reducing agent ?

- (A) NH_3 (B) SbH_3
(C) AsH_3 (D) PH_3

15. In which of the following molecules all the bonds are not equal?

- (A) BF_3 (B) AlF_3
(C) NF_3 (D) ClF_3

16. Aqueous H_2SO_4 reacts with 2-methyl-1-butene to give predominantly

- (A) Iso-butylhydrogen sulphate (B) 2-methyl-2-butene
(C) 2-methyl-1-butene (D) secondary-butylhydrogen sulphate

17. When starch is heated with water containing dilute HCl, it is changed to

- (A) Glucose (B) Fructose
(C) Glucose and Fructose (D) Sucrose

18. The co-ordination no of a central metal in a complex is determined by

- (A) the no of ligands around a metal ion bonded by sigma and pi bonds both
(B) the no of ligands around a metal ion bonded by pi bonds
(C) the no of ligands around a metal ion bonded by sigma bonds
(D) the no of only anionic ligands bonded to the metal ion.

19. Reaction of sodium with propyne followed by treatment with 1-bromopropane is expected to give
 (A) Hex-1-yne (B) Hex-2-yne
 (C) Hex-1-ene (D) Hex-2-ene
20. In the addition of HBr to propene in the absence of peroxides the first step involves the addition of
 (A) H⁺ ion (B) H⁻ ion
 (C) H radical (D) Br radical
21. How many moles of KI are required to produce 0.5 moles of K₂HgI₄ ?
 (A) 0.5 (B) 1.0
 (C) 1.5 (D) 2.0
22. Which of the following can participate in linkage isomerism ?
 (A) NH₃ (B) H₂O
 (C) H₂NCH₂CH₂NH₂ (D) NO₂⁻
23. How many electrons in an atom can have the said quantum numbers $n = 4$ and $l = 2$?
 (A) 6 (B) 10
 (C) 18 (D) 32
24. Co-ordination number of Na⁺ in the crystal structure of NaCl is
 (A) 4 (B) 3
 (C) 6 (D) 5
25. Diagonal relationship is shown by which of the following set of elements ?
 (A) Be and Mg (B) Li and Na
 (C) Li and Mg (D) Be and B
26. An element with atomic number 31 belongs to which block of the periodic table ?
 (A) *s*-block (B) *p*-block
 (C) *d*-block (D) *f*-block
27. The most electronegative element known in the periodic table is
 (A) Fluorine (B) Chlorine
 (C) Nitrogen (D) Oxygen
28. Which one of the following noble gases has the ionisation potential closest to that of oxygen ?
 (A) He (B) Ar
 (C) Kr (D) Xe
29. Which one of the following is the strongest oxo-acids of chlorine ?
 (A) HOCIO₃ (B) HOCIO₂
 (C) HOCIO (D) HOCl

30. Which one of the following interhalogen compounds possesses the T-shaped geometry ?
 (A) ClF_3 (B) ICl
 (C) ClF_5 (D) IF_5
31. Which one of the following elements belongs to 3d transition series ?
 (A) Zn (B) Cd
 (C) Hg (D) Au
32. The most common oxidation state exhibited by the lanthanides is
 (A) +2 (B) +3
 (C) +4 (D) +1
33. The coordination compound, $\text{CoCl}_3 \cdot 3\text{NH}_3$ will ionize to give
 (A) 2 Cl^- ions (B) 1 Cl^- ion
 (C) 3 Cl^- ions (D) No Cl^- ion
34. Oxidation number of cobalt in $\text{K}[\text{Co}(\text{CO})_4]$ is
 (A) +1 (B) +3
 (C) -1 (D) -3
35. Which one of the following is an electron deficient molecule ?
 (A) C_2H_2 (B) AlCl_3
 (C) H_2O (D) NH_3
36. Which of the following will have shortest bond length on the basis of M.O. theory ?
 (A) O_2^{2+} (B) O_2^+
 (C) O_2^- (D) O_2^{2-}
37. The number of lone pairs present on Xe atom in the compounds XeF_2 , XeF_4 and XeF_6 corresponds to
 (A) 2, 3, 1 (B) 1, 2, 3
 (C) 4, 1, 2 (D) 3, 2, 1
38. An aqueous solution of copper sulphate is
 (A) Acidic (B) Basic
 (C) Neutral (D) Amphoteric
39. Which one of the following hydrogen halides is most volatile ?
 (A) HF (B) HCl
 (C) HBr (D) HI
40. Silver chloride dissolves readily in
 (A) Water (B) Ethanol
 (C) Diethyl ether (D) Ammonia

41. A rxn involving the different reactants can never be
 (A) unimolecular rxn (B) first order rxn
 (C) second order rxn (D) bimolecular rxn
42. Chemical rxn with very high E_a values are generally
 (A) spontaneous (B) moderately fast
 (C) very slow (D) very fast
43. Hydrogen gas is a promising alternative fuel because it does not produce greenhouse gases. How many molecules are present in 1.0 kg of hydrogen gas
 (A) 3.0×10^{23} (B) 6.0×10^{23}
 (C) 3.0×10^{26} (D) 6.0×10^{26}
44. Liquids with molecules held together by van der Waals forces have which of the following properties ?
 (A) High solubilities in water (B) High melting points
 (C) Low boiling points (D) Significant electrical conductivities in the solid phase
45. $\text{Ag}^+ + \text{e}^- \rightarrow \square \text{Ag(s)}$ $E^0 = + 0.80 \text{ V}$
 $\text{Cr}^{3+} + 3\text{e}^- \rightarrow \square \text{Cr(s)}$ $E^0 = - 0.74 \text{ V}$
 Based on the standard reduction potentials for chromium and silver shown above, what is the cell potential for the reaction below ?
- $3 \text{Ag}^+ + \text{Cr(s)} \rightarrow \square 3 \text{Ag(s)} + \text{Cr}^{3+}$
 (A) 0.06 V (B) 1.54 V
 (C) 1.66 V (D) 3.14 V
46. How does the volume of 1 mol of an ideal gas change if the temperature and the pressure are both decreased by a factor of four ?
 (A) decreases by sixteen times (B) remains unchanged
 (C) increases by four times (D) increases by sixteen times
47. What is the correct solubility product expression for Ag_3PO_4 ?
 (A) $K_{sp} = [3\text{Ag}^+]^3 [\text{PO}_4^{3-}]$ (B) $K_{sp} = [\text{Ag}^+]^3 [\text{PO}_4^{3-}]$
 (C) $K_{sp} = [\text{Ag}^+] [\text{PO}_4^{3-}]$ (D) $K_{sp} = 3[\text{Ag}^+]^3 [\text{PO}_4^{3-}]$
48. The main difference between a suspension and a colloid is that
 (A) In suspensions the particles eventually settle to the bottom
 (B) In colloids the particles eventually settle to the bottom
 (C) In colloids, the solute is permanently dissolved in the solvent
 (D) In suspensions, the solute is permanently dissolved in the solvent

49. The compound whose 0.1 M solution is basic is
 (A) Ammonium acetate (B) Ammonium chloride
 (C) Ammonium sulphate (D) Sodium acetate
50. If you heat a 5 L balloon from a temperature of 25°C to 50°C, its new volume will be
 (A) 10 L (B) 2.5 L
 (C) 5.42 L (D) 4.61 L
51. A fuel cell does not “run down” like a standard battery because
 (A) the reactants in a battery must be stored inside the battery whereas the reactants for a fuel cell flow in as needed
 (B) a fuel cell continually recycles the same electrons whereas a battery must continually generate new ones
 (C) a battery is completely dependent upon oxidation-reduction reactions whereas a fuel cell depends on acid-base reactions
 (D) a battery has many moving parts, whereas a fuel cell has none
52. The primary reason balloons are filled with helium instead of hydrogen is because
 (A) Hydrogen is flammable (B) Hydrogen is toxic
 (C) Helium is lighter than hydrogen (D) Hydrogen seeps through the balloon material too quickly
53. For the reaction $2\text{HI}(\text{g}) \rightarrow \text{H}_2(\text{g}) + \text{I}_2(\text{g})$, $K_p = 0.0198$ at 721 K. In a particular experiment, the partial pressures of H_2 and I_2 at equilibrium are 0.710 and 0.888 atm, respectively. The partial pressure of HI is
 (A) 7.87 atm (B) 1.98 atm
 (C) 5.64 atm (D) 0.125 atm
54. Which of the following is not a major greenhouse gas ?
 (A) Methane (B) Carbon dioxide
 (C) Calcium Carbonate (D) Water Vapour
55. You are given a liquid mixture to identify. When you shine light from a laser pointer, the light passes through without scattering. The mixture is most likely a
 (A) Solution (B) Suspension
 (C) Colloid (D) Muddy water
56. The atomic no of rhodium is
 (A) 43 (B) 45
 (C) 47 (D) 76
57. In physisorption adsorbent does not show specificity for any particular gas because
 (A) involved van der Waals forces are universal

- (B) gases involved behave like ideal gases
- (C) enthalpy of adsorption is low
- (D) it is a reversible process

58. A compound formed by elements A and B crystallizes in cubic structure, in which atoms of A are at the corners while that of B are at the face centre. The formula of the compound is

- (A) AB_3
- (B) AB
- (C) A_3B
- (D) A_3B_2

59. A metal crystallizes in 2 cubic phases i.e., fcc and bcc whose unit cell lengths are 3.5 \AA and 3.0 \AA respectively. The ratio of their densities is

- (A) 3.12
- (B) 2.04
- (C) 1.46
- (D) 0.72

60. Specific conductivity of a solution

- (A) increases with dilution
- (B) decreases with dilution
- (C) remains unchanged with dilution
- (D) depends on the mass of electrolyte