

AIEEE 2011

Section : Chemistry

31. In context of the lanthanoids, which of the following statements is not correct?

- (1) Availability of 4f electrons results in the formation of compounds in +4 state for all the members of the series.
- (2) There is a gradual decrease in the radii of the members with increasing atomic number in the series.
- (3) All the members exhibit +3 oxidation state.
- (4) Because of similar properties the separation of lanthanoids is not easy.

Ans: [1]

32. In a face centred cubic lattice, atom A occupies the corner positions and atom B occupies the face centre positions. If one atom of B is missing from one of the face centred points, the formula of the compound is

- (1) A_2B_5
- (2) A_2B
- (3) AB_2
- (4) A_2B_3

Ans: [1]

33. The magnetic moment (spin only) of $[NiCl_4]^{4-}$ is

- (1) 1.41 BM
- (2) 1.82 BM
- (3) 5.46 BM
- (4) 2.82 BM

Ans: [4]

34. Which of the following facts about the complex $[Cr(NH_3)_6]Cl_3$ is wrong?

- (1) The complex gives which precipitate with silver nitrate solution.
- (2) The complex involves d^3sp^3 hybridisation and is octahedral in shape.
- (3) The complex is paramagnetic
- (4) The complex is an outer orbital complex.

Ans: [4]

35. The rate of a chemical reaction doubles for every $10^\circ C$ rise of temperature. If the temperature is raised by $50^\circ C$ the rate of the reaction increases by about:

- (1) 64 times
- (2) 10 times
- (3) 24 times
- (4) 32 times

Ans: [4]

36. 'a' and 'b' are van der Waals' constants for gases. Chlorine is more easily liquefied than ethane because

- (1) a for $Cl_2 >$ a for C_2H_6 but b for $Cl_2 <$ b for C_2H_6
- (2) a and b for $Cl_2 >$ a and b for C_2H_6
- (3) a and b for $Cl_2 <$ a and b for C_2H_6
- (4) a for $Cl_2 <$ a for C_2H_6 but b for $Cl_2 >$ b for C_2H_6

Ans: [2]

37. The hybridisation of orbitals of N atom in NO_3^- , NO_2^+ and NH_4^+ are respectively:

- (1) sp^2 , sp^3 , sp
- (2) sp , sp^2 , sp^3
- (3) sp^2 , sp , sp^3
- (4) sp , sp^3 , sp^2

Ans: [3]

38. Ethylene glycol is used as an antifreeze in a cold climate. Mass of ethylene glycol which should be added to 4 kg of water to prevent it from freezing at $6^\circ C$ will be: (K_f for water = $1.86 K kg mol^{-1}$ and molar mass of ethylene glycol = $62 g mol^{-1}$)

- (1) 304.60 g
- (2) 804.32 g
- (3) 204.30 g
- (4) 400.00 g

Ans: [2]

39. The outer electron configuration of Gd (Atomic No : 64) is

- (1) $4f^7 5d^1 6s^2$
- (2) $4f^3 5d^5 6s^2$
- (3) $4f^8 5d^0 6s^2$
- (4) $4f^4 5d^4 6s^2$

Ans: [1]

40. The structure of IF_7 is

- (1) pentagonal bipyramid
- (2) square pyramid
- (3) trigonal bipyramid
- (4) octahedral

Ans: [1]

41. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of:

- (1) an acetylenic triple bond
- (2) two ethylenic double bonds
- (3) a vinyl group
- (4) an isopropyl group

Ans: [3]

42. The degree of dissociation (α) of a weak electrolyte, A_xB_y is related to van't Hoff factor (i) by the expression:

- (1) $\alpha = \frac{x+y+1}{i-1}$
- (2) $\alpha = \frac{i-1}{(x+y-1)}$
- (3) $\alpha = \frac{i-1}{x+y-1}$
- (4) $\alpha = \frac{x+y-1}{i-1}$

Ans: [2]

43. A gas absorbs a photon of 355 nm and emits at two wavelengths. If one of the emissions is at 680 nm, the other is at:

- (1) 518 nm
- (2) 1035 nm
- (3) 325 nm
- (4) 743 nm

Ans: [4]

44. Identify the compound that exhibits tautomerism.

- (1) Phenol
- (2) 2-Butene
- (3) Lactic acid
- (4) 2-Pentanone

Ans: [4]

45. The entropy change involved in the isothermal reversible expansion of 2 moles of an ideal gas from a volume of 10 dm³ to a volume of 100 dm³ at 27°C is

- (1) 42.3 J mol⁻¹ K⁻¹
- (2) 38.3 J mol⁻¹ K⁻¹
- (3) 35.8 J mol⁻¹ K⁻¹
- (4) 32.3 J mol⁻¹ K⁻¹

Ans: [2]

46. Silver Mirror test is given by which one of the following compounds?

- (1) Benzophenone
- (2) Acetaldehyde
- (3) Acetone
- (4) Formaldehyde

Ans: [2, 4]

Both are correct

47. Trichloroacetaldehyde was subjected to Cannizzaro's reaction by using NaOH. The mixture of the products contains sodium trichloroacetate and another compound. The other compound is:

- (1) Chloroform
- (2) 2, 2, 2-Trichloroethanol
- (3) Trichloromethanol
- (4) 2, 2, 2-Trichloropropanol

Ans: [2]

48. The reduction potential of hydrogen half cell will be negative if:

- (1) $p(H_2) = 2 \text{ atm}$ and $[H^+] = 2.0 \text{ M}$
- (2) $p(H_2) = 1 \text{ atm}$ and $[H^+] = 2.0 \text{ M}$
- (3) $p(H_2) = 1 \text{ atm}$ and $[H^+] = 1.0 \text{ M}$
- (4) $p(H_2) = 2 \text{ atm}$ and $[H^+] = 1.0 \text{ M}$

Ans: [4]

49. Phenol is heated with a solution of mixture of KBr and $KBrO_3$. The major product obtained in the above reaction is:

- (1) 2, 4, 6-Tribromophenol
- (2) 2-Bromophenol
- (3) 3-Bromophenol
- (4) 4-Bromophenol

Ans: [1]

50. Among the following the maximum covalent character is shown by the compound:

- (1) $MgCl_2$
- (2) $FeCl_2$
- (3) $SnCl_2$
- (4) $AlCl_3$

Ans: [4]

51. Boron cannot form which one of the following anions?

- (1) BO_2^-
- (2) BF_6^{3-}
- (3) BH_4^-
- (4) $B(OH)_4^-$

Ans: [2]

52. Sodium ethoxide has reacted with ethanoyl chloride. The compound that is produced in the above reaction is

- (1) Ethyl ethanoate (2) Diethyl ether
(3) 2-Butanone (4) Ethyl chloride

Ans: [1]

53. Which of the following reagents may be used to distinguish between phenol and benzoic acid?

- (1) Neutral FeCl_3 (2) Aqueous NaOH
(3) Tollen's reagent (4) Molisch reagent

Ans: [1]

54. A vessel at 1000 K contains CO_2 with a pressure of 0.5 atm. Some of the CO_2 is converted into CO on the addition of graphite. If the total pressure at equilibrium is 0.8 atm the value of K is

- (1) 0.18 atm (2) 1.8 atm
(3) 3 atm (4) 0.3 atm

Ans: [2]

55. The strongest acid amongst the following compounds is

- (1) $\text{ClCH}_2\text{CH}_2\text{CH}_2\text{COOH}$
(2) CH_3COOH
(3) HCOOH
(4) $\text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{CO}_2\text{H}$

Ans: [4]

56. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides?

- (1) $\text{K}_2\text{O} < \text{Na}_2\text{O} < \text{Al}_2\text{O}_3 < \text{MgO}$
(2) $\text{Al}_2\text{O}_3 < \text{MgO} < \text{Na}_2\text{O} < \text{K}_2\text{O}$
(3) $\text{MgO} < \text{K}_2\text{O} < \text{Al}_2\text{O}_3 < \text{Na}_2\text{O}$
(4) $\text{MgO} < \text{K}_2\text{O} < \text{MgO} < \text{Al}_2\text{O}_3$

Ans: [2]

57. A 5.2 molal aqueous solution of methyl alcohol, CH_3OH is supplied. What is the mole fraction of methyl alcohol in the solution?

- (1) 0.050 (2) 1.100
(3) 0.190 (4) 0.086

Ans: [4]

58. The presence or absence of hydroxy group on which carbon atom of sugar differentiates RNA and DNA?

- (1) 4th (2) 1st
(3) 2nd (4) 3rd

Ans: [3]

59. Which of the following statements is wrong?

- (1) N_2O_4 has two resonance structures.
(2) The stability of hydrides increases from NH_3 to BiH_3 in group 15 of the periodic table.
(3) Nitrogen cannot form $d\pi - p\pi$ bond.
(4) Single $\text{N} - \text{N}$ bond is weaker than the single $\text{P} - \text{P}$ bond.

Ans: [2]

60. Which of the following statements regarding sulphur is incorrect?

- (1) The oxidation state of sulphur is never less than +4 in its compounds.
(2) S_2 molecular is paramagnetic
(3) The vapour at 200°C consists mostly of S_8 rings.
(4) At 600°C the gas mainly consists of S_2

Ans: [1]