

# AIEEE-2011

## (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.....4

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

Ans.....3

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.....3

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.....2

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  $-6^{\circ}\text{C}$  will be: ( $K_f$  for water =  $1.86\text{ K kg mol}^{-1}$  and molar mass of ethylene glycol =  $62\text{ g mol}^{-1}$ )

(1) 304.60 g

(2) 804.32 g

(3) 204.30 g

(4) 400.00 g

Ans.....1

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)  $4f^8 5d^0 6s^2$

(d)  $4f^4 5d^4 6s^2$

Ans.....4

40. The structure of  $\text{IF}_7$  is

(1) pentagonal bipyramid

(2) square pyramid

(3) trigonal bipy

(4) octahedral

Ans.....4

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.....2

42. The degree of dissociation ( $\alpha$ ) of a weak electrolyte,  $\text{A}_x\text{B}_y$ , is related to van't Hoff factor ( $i$ ) by the expression:

$$(1) a = \frac{x+y+1}{i-1}$$

$$(2) a = \frac{i-1}{(x+y-1)}$$

$$(3) a = \frac{i-1}{x+y-1}$$

$$(4) a = \frac{x+y-1}{i-1}$$

Ans.....1

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.....3

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 dm<sup>3</sup> to a volume of 100 dm<sup>3</sup> at 27°C is

(1) 42.3 J mol<sup>-1</sup> K<sup>-1</sup>

(2) 38.3 J mol<sup>-1</sup> K<sup>-1</sup>

(3) 35.8 J mol<sup>-1</sup> K<sup>-1</sup>

(4) 32.3 J mol<sup>-1</sup> K<sup>-1</sup>

Ans.....1

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

(1) Benzophenone

(2) Acetaldehyde

(3) Acetone

(4) Formaldehyde

Ans.....2 and 4

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.....1

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

- (1)  $p(\text{H}_2) = 2 \text{ atm}$  and  $[\text{H}^+] = 2.0\text{M}$  (2)  $p(\text{H}_2) = 1 \text{ atm}$  and  $[\text{H}^+] = 2.0\text{M}$   
(3)  $p(\text{H}_2) = 1 \text{ atm}$  and  $[\text{H}^+] = 1.0\text{M}$  (4)  $p(\text{H}_2) = 2 \text{ atm}$  and  $[\text{H}^+] = 1.0\text{M}$

Ans.....3

49. Phenol is heated with a solution of mixture of KBr and  $\text{KBrO}_3$ . The major product obtained in the above reaction is:

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

Ans.....4

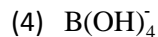
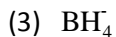
50. Among the following the maximum covalent character is shown by the compound:

- (1)  $\text{MgCl}_2$  (2)  $\text{FeCl}_2$   
(3)  $\text{SnCl}_2$  (4)  $\text{AlCl}_3$

Ans.....4

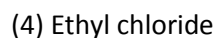
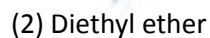
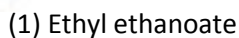
51. Boron cannot form which one of the following anions?

- (1)  $\text{BO}_2^-$  (2)  $\text{BF}_6^{3-}$



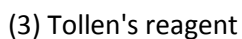
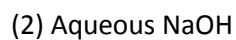
Ans.....2

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



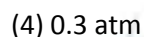
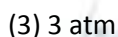
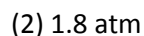
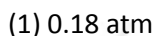
Ans.....4

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



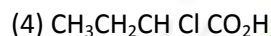
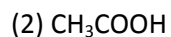
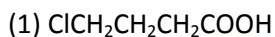
Ans.....1

54. A vessel at 1000 K contains  $\text{CO}_2$  with a pressure of 0.5 atm. Some of the  $\text{CO}_2$  is converted into  $\text{CO}$  on the addition of graphite. If the total pressure at equilibrium is 0.8 atm the value of K is



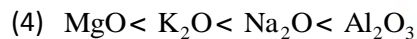
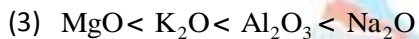
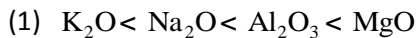
Ans.....2

55. The strongest acid amongst the following compounds is



Ans.....2

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



Ans.....1

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) 4<sup>th</sup>

(2) 1<sup>st</sup>

(3) 2<sup>nd</sup>

(4) 3<sup>rd</sup>

Ans.....2

59. Which of the following statement 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 N-N bond is weaker than the single  $P \sim P$  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  $200^\circ C$  consists mostly of  $S_8$  rings.

(4) At  $600^\circ C$  the gas mainly consists of  $S_2$

Ans.....2