

## GGSIPIU Chemistry 2005

1. The standard e.m.f. for the cell reaction,  $2\text{Cu}^+_{\text{aq}} \rightarrow \text{Cu}_s + \text{Cu}^{2+}_{\text{aq}}$  is +0.36 V at 298 K. The equilibrium constant of the reaction is :

a  $5 \times 10^{-6}$       b  $1.4 \times 10^{12}$

c  $7.4 \times 10^{12}$     d  $1.2 \times 10^{-6}$

2. The standard e.m.f of the cell,  $\text{Cd} | \text{CdCl}_2 \text{ aq } 0.1 \text{ M} || \text{AgCl} | \text{Ag}$  in which the cell reaction is :



Is 0.6915 V at  $0^\circ \text{C}$  and 0.6753 V at  $25^\circ \text{C}$ . The enthalpy change of the reaction at  $25^\circ \text{C}$ . The enthalpy change of the reaction at  $25^\circ \text{C}$  is :

a -176 kJ    b -234.7 kJ

c +123.5 kJ    d -167.26 kJ

3. Which of the following statement is true ?

a The relative lowering of vapour pressure of a solution is equal to the mole fraction of the solute present in the solution.

b Passage of solute molecules towards solution side through semipermeable membrane is osmosis.

c The boiling point of a solution is always lower than the solvent

d The boiling point of a liquid is the temperature at which its vapour becomes equal to 760 mm

4. The deviation from the ideal gas behavior of a gas can be expressed as :

a  $Z = \frac{P}{VRT}$       b  $Z = \frac{PV}{nRT}$

c  $Z = \frac{nRT}{PV}$       d  $Z = \frac{VR}{PT}$

5. Which of the following statement is not true ?

a The pressure of a gas is due to collision of the gas molecules with the walls of the container

b The molecular velocity of any gas is proportional to the square root of the absolute temperature

c The rate of diffusion of a gas directly proportional to the density of the gas at constant pressure

d Kinetic energy of an ideal gas is directly proportional to the absolute temperature

6. The unit of second order reaction rate constant is :

a  $L^{-1} \cdot mol \cdot s^{-1}$

b  $L^2 \cdot mol^{-2} \cdot s^{-1}$

c  $L \cdot mol^{-1} \cdot s^{-1}$

d  $s^{-1}$

7. Hess' law states that :

a the standard enthalpy of an overall reaction is the sum of the enthalpy changes in individual reactions

b enthalpy of formation of a compound is same as the enthalpy of decomposition of the compound into constituent elements, but with opposite sign

c at constant temperature the pressure of a gas is inversely proportional to its volume

d the mass of a gas dissolved per litre of a solvent is proportional to the pressure of the gas in equilibrium with the solution

8. The half-life of a reaction is halved as the initial concentration of the reactant is doubled. The order of the reaction is :

a 0.5      b 1

c 2      d 0

9. One gram of A decays by  $\beta$ -emission to 0.125 g in 200 years. The half life period of the reaction is :

a 0.014 years      b 6.66 years

c 66.6 years      d 666 years

10. Isotopes are :

a atoms of different elements having same mass number

- b atoms of same elements having same mass number
- c atoms of same element having different mass number
- d atoms of different element having same number of

neutrons

11. Acid hydrolysis of sucrose is a :

- a pseudo first order reaction
- b zero order reaction
- c second order reaction
- d unimolecular reaction

12. The product obtained after positron emission from  ${}_{31}^{68}\text{Ga}$  is :

- a  ${}_{30}^{68}\text{Ga}$       b  ${}_{30}^{68}\text{Zn}$
- c  ${}_{31}^{69}\text{Zn}$       d  ${}_{31}^{69}\text{Ga}$

13. The relationship between coefficient of viscosity of a liquid and temperature can be expressed as :

- a  $\eta = Ae^{ERT}$       b  $\eta = Ae^{E/RT}$
- c  $\eta = ET/R$       d  $\eta = Ae^{RT/E}$

14. An aqueous solution in which the  $\text{H}^+$  ion concentration is greater than  $10^{-7}$  M is said to be :

- a acidic      b alkaline
- c neutral      d none of these

15. In the hydrolysis of a salt of weak acid and weak base, the hydrolysis constant  $K_h$  is equal to :

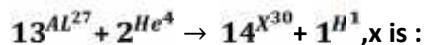
- a  $\frac{K_w}{K_b}$       b  $\frac{K_b}{K_a}$
- c  $\frac{K_w}{K_a \times K_b}$       d  $K_a \times K_b$

16. In the following reaction,  $\text{AgCl} + \text{KI} \rightleftharpoons \text{KCl} + \text{AgI}$  as KI is added, the equilibrium is shifted towards right giving more AgI precipitate, because :

- a both AgCl and AgI are sparingly soluble
- b the  $K_{sp}$  of AgI is lower than  $K_{sp}$  of AgCl

- c the  $K_{sp}$  of AgI is higher than  $K_{sp}$  of AgCl  
 d both AgCl and AgI have same solubility product

17. In the nuclear reaction ;



- a Si b AL c Mg d P

18. What kind of molecule  $\text{AlCl}_3$  is ?

- a Bronsted acid b Lewis acid  
 c Lewis base d Bronsted base

19. How much  $\text{K}_2\text{Cr}_2\text{O}_7$  molecular weight = 294.19 is required to prepare one litre of 0.1 N solution ?

- a 9.8063 g b 7.3548 g  
 c 3.6774 g d 4.903 g

20. The ionic strength of a solution containing 0.1 mol/kg of KCl and 0.2 mol/kg of  $\text{CuSO}_4$  is :

- a 0.3 b 0.6 c 0.9 d 0.2

21. A gas can expand from 100 mL to 250 mL under a constant pressure of 2 atm. The work done by gas is :

- a 30.38 joule b 25 joule  
 c 5 k Joule d 16 joule

22. If the r.m.s speed of gaseous molecule is  $x$  m/sec at a pressure  $P$  atm, then what will be the r.m.s speed at a pressure  $2P$  atm and constant temperature ?

- a  $x$  b  $2x$  c  $4x$  d  $x/4$

23. Ionic mobility of  $\text{Ag}^+$  is  $\lambda_{\text{Ag}^+} = 5 \times 10^{-1} \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$ :

- a  $5.2 \times 10^{-9}$  b  $2.4 \times 10^{-9}$   
 c  $1.52 \times 10^{-9}$  d  $8.25 \times 10^{-9}$

24. Which of the following is the strongest acid ?

- a HF b HCl c HBr d HI

25. What is the general outer electronic configuration of the coinage metal ?

a  $ns^2 np^6$       b  $n-1d^{10} ns^1$

b  $n-1d^{10} ns^2$     d  $n-1d^9 ns^2$

26. How does the ionization energy of 1<sup>st</sup> group element vary?

a Increases down the group

b Decreases down the group

c Remains unchanged

d Variation is not regular

27. What is the oxidation number of chlorine in  $ClO_3^-$  ?

a +5    b +3    c +4    d +2

28. What type of hybridisation takes place in the N atom of  $NH_3$  ?

a  $sp^2$     b  $sp^3$     c  $dsp^2$     d  $sp$

29. What is the co-ordination number of  $Cl^-$  in a NaCl crystal ?

a 8      b 6      c 4      d 3

30. How many electrons are involved in oxidation of  $KMnO_4$  in basic medium ?

a 1      b 2      c 5      d 3

31. The magnetic moment of  $K_3[Fe(CN)_6]$  is found to be 1.7 BM. How many unpaired electrons are present per molecule ?

a 1      b 2      c 3      d 4

32. Which among the following is an electron deficient compound ?

a  $NF_3$                       b  $PF_3$

c  $BF_3$                       d  $AsF_3$

33. Arrange the hydro-acids of halogens in increasing order of acidity .

a  $HF < HCl < HBr < HI$

b  $HI < HBr < HCl < HF$

c  $HF < HBr < HI < HCl$

d  $HF < HI < HBr < HCl$

34. What is the product of the reaction of  $\text{H}_2\text{O}_2$  with  $\text{Cl}_2$  ?



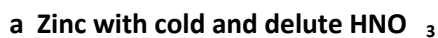
35. Which of the following organo-silicon compound on hydrolysis will give a three dimensional silicon ?



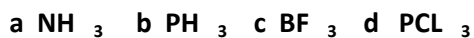
36.  $\text{NaOCl}$  is used as a bleaching agent and sterilizing agent. It can be synthesized by the action of



37. How can you synthesize nitric oxide in the laboratory ?



38. Which of the following does not have a lone pair on the central atom ?



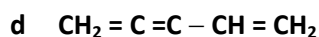
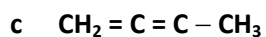
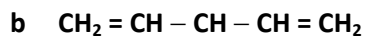
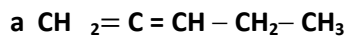
39. Which colourless gas evolves when  $\text{NH}_4\text{Cl}$  reacts with Zinc in a dry cell battery ?



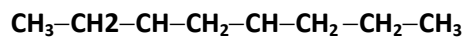
40. What is the nature of the bond between B and O in  $\text{C}_2\text{H}_5\text{OBH}_3$  ?



41. An alkene gives two moles of  $\text{HCHO}$ , one mole of  $\text{CO}_2$  and one mole of  $\text{CH}_3\text{COCHO}$  on ozonolysis. What is its structure ?



42. IUPAC name of the compound,

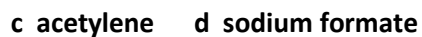


- a 4-isopropyl,6-methyl octane
- b 3-methyl,5-1 -methyl elthyl octane
- c 3-methyl,5 isoprophyl octane
- d 6-methyl,4-1 -methylethyl octane

43. The order of melting point of ortho,para,meta-nitrophenol is



44. When  $\text{CHCl}_3$  is boiled with  $\text{NaOH}$ , it gives :



45. Which of the following is an example of ketohexose ?

- a Mannose      b galactose  
c Maltose      d Fructose

46. When aniline is treated with sodium nitrite and hydrochloric acid at  $0^{\circ}\text{C}$ , it gives

- a phenol and  $\text{N}_2$   
b diazonium salt  
c hydrazo compound  
d no reaction takes place

47. When benzoic acid is treated with  $\text{PCl}_5$  at  $100^{\circ}\text{C}$ , it gives :

- a benzoyl chloride  
b o-chlorobenzoic acid  
c p-chlorobenzoic acid  
d benzyl chloride

48. The key step in Cannizaro's reaction is the intermolecular shift of :

- a proton      b hydride -ion  
c hydronium ion      d hydrogen bond

49. Aldehydes and ketones can be reduced to hydrocarbon by using :

- a  $\text{LiAlH}_4$       b  $\text{H}_2/\text{Pd}-\text{BaSO}_4$   
c  $\text{Na}-\text{Hg}/\text{HCl}$       d  $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\text{ONa}$

50. Cinnamic acid is formed when  $\text{C}_6\text{H}_5-\text{CHO}$  condenses with  $\text{CH}_3\text{CO}_2\text{O}$  in presence of :

- a concentrated  $\text{H}_2\text{SO}_4$   
b sodium acetate  
c sodium metal  
d anhydrous  $\text{ZnCl}_2$

51. What is the product of the reaction of phenol with  $\text{CHCl}_3$  in aqueous  $\text{NaOH}$  and subsequent hydrolysis ?

- a Salicylic acid      b Salicylaldehyde



c Benzoic acid    d Benzaldehyde

52. On treatment with chlorine in presence of sunlight, toluene gives the product :

a o -chloro toluene

b 2,5 -dichloro toluene

c p -chloro toluene

d benzyl chloride

53. Which of the following cycloalkane gives open chain compound, when reacts with bromine ?

a Cyclopropane    b Cyclopentane

c Cyclohexane    d Cyclooctane

54. Which of the following intermediate have the complete octate around the carbon atom ?

a Carbonium ion    b Carbanion

d Free radical    d Carbene

55. If the dipole moment of toluene and nitro-benzene are 0.43 D and 3.93 D, Then what is the expected dipole moment of P-nitro toluene ?

a 3.50 D    b 2.18 D

c 4.36 D    d 5.30 D

56. What is the product when 2-butyne is treated with liquid  $\text{NH}_3$  in presence of lithium ?

a n-butane    b cis -2 butene

c trans -2-butene    d 1 -butene

57. In the dichlorination reaction of propane, mixture of products are obtained. How many isomers the mixture contains ?

a 2    b 3

c 4    d 5

58. Cyclopentadienyl anion is :

a aromatic    b non -aromatic

c non -planer    d aliphatic

59. What is the product of the reaction of 1,3-butadiene with  $\text{Br}_2$  ?

- a 1,4 -dibromo butane
- b 1,2 dibromo butane
- c 3,4 -dibromo butane
- d 2,3 -dibromo to butane

60. The most common type of reaction in aromatic compound is :

- a elimination reaction
- b addition reaction
- c electrophilic substitution reaction
- b rearrangement reacttion