Date: 07 -05-2022 Time: 60 min

Subject code: CY115 Max Marks:30

SECTION-A

I. Answer all the questions by selecting the most suitable alternative.

(1M × 20 = 20M)

1) 4g of NaOH (M.wt=40 g/mole) dissolve in 200 ml of solution. The Molarity of NaOH solution is

A) 2M C) 0.1M

B) 0.5M D) 1M

2) The normality of 0.1 M H_2SO_4 is

A) 0.1 B) 0.05 C) 0.2 D) 0.2

3) How many grams of water are present in 0.1m solution of sulphuric acid

A) 10g B)20g C) 50 g D) 100g

4) A solution is prepared by dissolving 2g of substance A in 18g of water .Calculate the mass percentage of solvent

A) 10% B) 11.11% C) 90% D) 88.89%

5) Two solutions are separated by a semi permeable membrane .The one which is of lower osmotic pressure is called

A) Isotoinc B) Hypertonic C) Iso osmotic D) Hypotonic

6) 1g of non-electrolyte solute (molar mass=250g/mole) was dissolved in 51.2g of Benzene .If the freezing point depression constant (K_f) of Benzene is 5.12K.kg/mole, the freezing point of benzene will be lowered by

A) 0.3K B) 0.4K C) 273.55K D) 273.45K

7) 18 g of glucose(Molar mass =180 g/mole) is dissolved in 1Kg of water (K_b=0.52K.Kg/mole) in sauce pan. The elevation in boiling point of solution is

A) 273.098K B) 273.202K C) 0.052K D) 100.052K

8) With increasing pressure, the solubility of solid in a liquid

A) increases B)Decreases

C) Remains unaffected D) May be increases or decreases

9) Given the reaction $A_{(g)}+B_{(g)} \rightleftharpoons C_{(g)} + D_{(g)}$. Find the equilibrium constant for this reaction if 0.7 moles of C are formed when one mole of A and one mole of B are initially present.

A) 5.44 B) 6.22 C) 9.67 D) 1.23

10) At a certain temperature K_{eq} for the reaction $3\ C_2H_{2(g)} \rightleftharpoons C_6H_{6(g)}$ is 4 .If the equilibrium concentration of C_2H_2 is 0.5mole/lit ,what is the equilibrium concentration of C_6H_6

A) 1M B) 0.5M C) 1.5M D) Data insufficient

11) The reaction $A_{(g)}+2B_{(g)} \rightleftharpoons 2C_{(g)}$ was studied by starting with equal amount of A &B in a constant volume vessel .Which of the following is true at equilibrium.

A). [A]= [B] B). [C]=[B] C) [B]<[A] D) [A]<[B]

12) Which of the following is incorrect statement(s) regarding equilibrium constant

A) The equilibrium constant is Independent of initial concentration of reactants and products

B) The equilibrium constant is Independent of temperature

C) Both A&B

D) The equilibrium constant for the reverse reaction is equal to the inverse of the equilibrium constant for the forward reaction

13) Which of the following is a Lewis acid

A) OH^- B) H_2O C) $AlCl_3$ D) NH_3

14) The conjugate base of HCO_3^- is

A) H_2CO_3 B) CO_3^{-2} C) CO_3^- D) None of the above

15) In which of the following reaction $K_p=K_c$

A) $3A_{(g)}+2B_{(s)} \rightleftharpoons 2C_{(g)}$

B) $A_{(g)}+2B_{(g)} \rightleftharpoons 2C_{(s)}$

C) $2A_{(g)}+2B_{(g)} \rightleftharpoons 3C_{(g)}$

D) $A_{(g)}+B_{(g)} \rightleftharpoons 2C_{(g)}$

16) The solubility of Ag_2CrO_4 is 1.3×10^{-4} mole/L .The solubility product is

A) 8.78×10^{-12} B) 2.24×10^{-6} C) 10^{-5} D) None of the above

17) Temporary hardness can be removed by

A) Calgon method B) Clark's method

C) Treatment with washing soda D) Ion-exchange method

18) Which of the following molecule is electron precise hydride?

A) CH_4 B)H_2O C) B_2H_6 D) NaH

19) $P_4O_{10}(s)$ on hydrolysis gives

A) H_3PO_2 B) $H3PO_3$ C) H_3PO_4 D) H_3PO_5

20) How many hydrogen bonded water molecule(s) are associated in $CuSO_4.5H_20$?

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

SECTION –B

Answer any two of the following questions (2×5M=10M)

1) A solution containing 30g of non volatile solute exactly in 90g of water has a vapor pressure of 2.8kpa at 298K .Further 18g of water is then added to the solution and the new vapor pressure becomes 2.9kpa at 298K .Calculate the molar mass of solute. 5M

2) Write the differences between Ideal and Non ideal solution. 5M

3) The K_p value for the reaction $H_{2\,(g)}+I_{2(g)} \rightleftharpoons 2HI_{\,(g)}$ 49. If the initial pressure of $H_{2(g)}$ and $I_{2(g)}$ are 0.5 atm respectively . Determine the partial pressure of each gas at equilibrium. 5M

4) a) State the Le-chateliers principle 1M

b) Consider the reaction

$$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) \quad :\Delta H = -189.4 \text{ kJ/mole}$$

Indicate the direction in which the equilibrium will shift when

i) Temperature is decreased

ii) Concentration SO_2 increased

iii) Helium gas is added at constant pressure

iv) Adding the catalyst 4M