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**SPLIT- II EXAMINATION**

**CHEMISTRY**

**GRADE: XII MARKS: 70**

**DATE: 23.12.2022 TIME – 3 hr**

**GENERAL INSTRUCTIONS:**

1. All Questions are compulsory.
2. **SECTION-A:** Question number 1 to 18 carry 1 mark.
3. **SECTION-B:** Question number 19 to 25 carry 2 marks.
4. **SECTION-C:** Question number 26 to 30 carry 3 marks.
5. **SECTION-D:** Question number 31 and 32 carry 4 marks.
6. **SECTION-E**: Question number 33 to 35 carry 5 marks.

**SECTION-A**

1. Colligative properties depend on \_\_\_\_\_\_\_\_\_\_\_\_.  
(i) the nature of the solute particles dissolved in solution.  
(ii) the number of solute particles in solution.  
(iii) the physical properties of the solute particles dissolved in solution.  
(iv) the nature of solvent particles.

**2.** Which one of the following will not undergo Hoffmann bromamide reaction

(a) CH3CONHCH3 (b) CH3CH2CONH2 (c) CH3CONH2 (d) C6H5CONH2

**3.** Which of the following ligands form a chelate?  
(a) Acetate (b) Oxalate  
(c) Cyanide (d) Ammonia

**4.** Molar conductivity of 0.15 M solution of KCl at 298 K, if its conductivity of 0.0152 S cm-1 w ill be  
(a) 124 Ω-1 cm² mol-1 (b) 204 Ω-1 cm² mol-1  
(c) 101 Ω-1 cm² mol-1 (d) 300 Ω-1 cm² mol-1

**5.**According to Werner’s theory of coordination compounds  
(a) Primary valency is ion isable  
(b) Secondary valency is ionisable  
(c) Primary and secondary valencies are lonisable  
(d) Neither primary nor secondary valency ¡s ionisable

**6.** When aniline reacts with acetic anhydride the product formed is

(a) o – aminoacetophenone (b) m-aminoacetophenone

(c) p – aminoacetophenone (d) acetanilide

**7.** The molar conductivity is maximum for the solution of concentration  
(a) 0.004 M  
(b) 0.002 M  
(c) 0.005 M  
(d) 0.001 M

**8.** Units of the properties measured are given below. Which of the properties has been not matched correctly?  
(a) Molar conductance = Sm2 mol-1  
(b) Cell constant = m-1

(c) Specific conductance of = S m²  
(d) Equivalence conductance = S m² (g eq)-1

**9.** An unripe mango placed in a concentrated salt solution to prepare

pickle, shrivels because \_\_\_\_\_\_\_\_\_\_\_\_\_.

a. it gains water due to osmosis.

b. it loses water due to reverse osmosis.  
c. it gains water due to reverse osmosis.

d. it loses water due to osmosis.

**10.** Which of the following shows maximum number of isomers?  
(a) [Cr(NH3)4Cl2]  
(b) [Ni(en)NH3]2+  
(c) [Ni(C2O4] (en)2]2+  
(d) [Cr(SCN)2(NH3)4]+

Read the statements given as assertion & reason both and choose the correct option as per the following instructions.

**(**A) if both assertion & reason are correct statements and reason is the correct explanation of assertion.  
 (B) if both assertion & reason are correct statements and reason is not the correct explanation of assertion.  
 (C) if the assertion is the correct statement & the reason is an incorrect statement.  
(D) if the assertion is incorrect statement and reason is the correct statement.

**11.**

**12.** **Assertion:** Acetamide on reaction with KOH and bromine gives acetic acid  
**Reason:**Bromine catalyses hydrolysis of acetamide.

**13.** Arrange the following compounds in-decreasing order of their boiling point

(i) CH3Br (ii) CH3CH2Br (iii) CH3CH2CH2Br (iv) CH2CH2CH2CH2Br

(a) (i) > (ii) > (iii) > (iv)  
(b) (iv) > (iii) > (ii) > (i)  
(c) (i) > (iii) > (ii) > (iv)  
(d) (iii) > (iv) > (i) > (ii)

**14.** The order of basic strength for methyl substituted amines in aqueous solution is

(a) N(CH3)3> N(CH3)2H> N(CH3)H2> NH3

(b) N(CH3)H2>N(CH3)2H > N(CH3)3>NH3

(c) NH3> N(CH3)H2> N(CH3)2 H>N(CH3)3

(d) N(CH3)2H>N(CH3)H2> N(CH3)3> NH3

**15.** Which of the following reactions follows Markovnikov’s rule?  
(a) C2H4 + HBr  
(b) C3H6 + Cl6  
(c) C3H6 + HBr  
(d) C3H6 + Br2

**16.** If 96500 coulomb electricity is passed through CuSO4 solution, it will liberate  
(a) 63.5 gm of Cu (b) 31.76 gm of Cu  
(c) 96500 gm of Cu (d) 100 gm of Cu

**17.** The negative part of the addendum (the molecule to be added) adds on the carbon atom of the double bond containing the least number of hydrogen atoms. This rule is known as  
(a) Saytzeffs rule  
(b) Peroxide rule  
(c) Markovnikov’s rule  
(d) van’t hoff rule

**18.** In which of the following allotropes of carbon, percentage of carbon is maximum?  
(a) Wood charcoal  
(b) Coconut charcoal  
(c) Graphite  
(d) None of these

**SECTION-B**

**19.  Calculate the mole fraction of benzene in solution containing 30% by mass in carbon tetrachloride.**

**20.** Determine the values of equilibrium constant (Kc) and ΔG° for the following reaction :  
Ni(s) + 2Ag+ (aq) → Ni2+ (aq) + 2Ag(s),  
E° = 1.05 V  
(1F = 96500 C mol-1)

**21.** How would you account for the following :  
(a) Electrophilic susbstitution in case of aromatic amines takes place more readily than benzene.  
(b) Ethanamide is a weaker base than ethanamine.

**22.**

**OR**

**23.** Non-ideal solutions exhibit either positive or negative deviations from Raoult’s law. What are these deviations and why are they caused? Explain with one example for each type.

**24.**

**25.**

**SECTION-C**

**26.**

**27.** Two half cell reactions of an electrochemical cell are given below :  
MnO–4(aq) + 8H+ (aq) + 5e– → Mn2+ (aq) + 4H2O (I), E° = + 1.51 V  
Sn2+ (aq) → 4 Sn4+ (aq) + 2e–, E° = + 0.15 V  
Construct the redox equation from the two half cell reactions and predict if this reaction favours formation of reactants or product shown in the equation.

**28.** Give the structures of products A, B, and C in the following reactions:   
Class 12 Chemistry Important Questions Chapter 13 Amines 12

Class 12 Chemistry Important Questions Chapter 13 Amines 14

**29.**

**30. Calculate the following:  
(a) molality  
(b) molarity and  
(c) mole fraction of KI if the density of 20% (mass/mass) aqueous KI solution is 1·202 g mL-1.**

**SECTION-D**

31. Few colligative properties are:  
(a) relative lowering of vapour pressure: depends only on molar concentration of solute (mole fraction) and independent of its nature.  
(b) depression in freezing point: it is proportional to the molal concentration of solution.  
(c) elevation of boiling point: it is proportional to the molal concentration of solute.  
(d) osmotic pressure: it is proportional to the molar concentration of solute.  
A solution of glucose is prepared with 0.052 g at glucose in 80.2 g of water. (Kf = 1.86 K kg mol-1 and Kb = 5.2 K kg mol-1)

1. Molality of the given solution is

a.**0.0052 m b. 0.0036 m c. 0.0006 m d. 1.29 m**

2. Boiling point for the solution will be

a. **373.05 K b. 373.15 K c. 373.02 K d. 372.98 K**

3. The depression in freezing point of solution will be

a. **0.0187 K b.  0.035 K c. 0.082 K d. 0.067 K**

4. Mole fraction of glucose in the given solution is

**a. 6.28 x 10-5 b. 1.23 x 10-4 c. 0.00625 d. 0.00028**

**32.** A mixture of two aromatic compounds (A) and (B) was separated by dissolving in chloroform followed by extraction with aqueous KOH solution. The organic layer containing compound (A), when heated with alcoholic solution of KOH produce C7H5N (C) associated with unpleasant odour.

1. The reaction of (A) with alcoholic solution of KOH to produce (C) of unpleasant odour is called

a. Sandmeyer reaction b. Carbyl amine reaction

c. Ullmann reaction d. Riemer-Tiemann reaction

2. The alkaline aqueous layer (B) when heated with chloroform and then acidified give a mixture of isomeric compounds of molecular formula C7H6O2. (B) is

a. Benzaldehyde b. Benzyl alcohol

c. Benzoic acid d. Toluene

3. In the chemical reaction, CH3CH2NH2 + CHCl3 + 3KOH ⟶ (A) + (B) + 3H2O the compounds (A) and (B)  are respectively

a. C2H5NC and KCl b. C2H5CN and KCl

c. C2H5CONH2 and KCl d. C2H5NC and K2CO3

4. Direct nitration of an aromatic compound (A) is not feasible because

a. The reaction cannot be stopped at the stage of mononitration

b. a mixture of o,m and p nitroaniline is always obtained

c. nitric acid oxidizes most of the aromatic compound and gives oxidation products.

d. all the above.

**SECTION-E**

**36.**

**37.a.**An aqueous solution of sodium chloride freezes below 273 K. Explain the lowering in freezing points of water with the help of a suitable diagram.

b. State Henry’s law. What is the effect of temperature on the solubility of a gas in a liquid?

c. On mixing liquid X and liquid Y, volume of the resulting solution decreases. What type of deviation from Raoult’s law is shown by the resulting solution? What change in temperature would you observe after mixing liquids X and Y?  
(ii) What happens when we place the blood cell in water (hypotonic solution)? Give reason.

**38. a.** Write the reactions taking place at cathode and anode in lead storage battery when the battery is in use. What happens on charging the battery?

b. The standard electrode potential (E°) for Daniel cell is +1.1 V. Calculate the ΔG° for the reaction  
Zn(s) + Cu2+(aq) → Zn2+(aq) + Cu(s)  
(1 F = 96500 C mol-1).

c. The conductivity of 0.001 M acetic acid is 4 × 10-5 S/cm. Calculate the dissociation constant of acetic acid, if molar conductivity at infinite dilution for acetic acid is 390 S cm2/mol.