FIRST TERMINAL EXAMINATION 2080

Subject : CHEMISTRY **GRADE XII (SCIENCE)** **F.M.: 75**

Time : 3:00 hrs. **SET A** **P.M. : 30**

Group 'A'

Circle the best answer: **[11×1=11]**

1. The rate constant of a reaction is 2.1×10^{-2} mol^{-2} L^2 min^{-1}. The order of the reaction is
   a) zero b) first c) second d) third
2. How much water should be evaporated from 400 ml of $\frac{N}{10}$ HCl to make it exactly 2N?
   a) 360mL b) 370mL c) 380mL d) 390mL
3. What would be the value of rate constant (K), if the concentration of reactant is increased by X
   a) $\ln\frac{k}{x}$ b) $\frac{k}{x}$ c) $k+x$ d) k
4. Alcohol vapour can be dehydrated by passing over heated
   a) Al_2O_3 b) CaO c) $CaCl_2$ d) $Ca(OH)_2$
5. Iodoform is formed when
   a) Acetone reacts with I_2 and alkali
   b) C_2H_4 reacts with I_2 in CCl_4
   c) Methyl alcohol reacts with alkaline hypo-iodite
   d) Formaldehyde reacts with alkali
6. Haloforms are trihalogen derivaties of
   a) Ethane b) Methane c) Propane d) Benzene
7. A commercially available sample of H_2SO_4 is 20% by mass (density 1.1g/L) what is the molarity of the solution?
   a) 22.4 b) 2.24 c) 3.6 d) 4.48
8. The boiling points of alcohols are much higher than the hydrocarbons of comparable molecular masses due to:
   a) Dipole-dipole interaction b) Vander Waals attraction
   c) Intramolecular H-bonding d) Intermolecular H-bonding
9. Reaction intermediate is not formed in .....
   a) SN_1 reaction b) SN_2 reaction
   c) Markovnikov's addition d) Anti-Markovnikov's addition
10. Which of the following has the highest boiling point?
    a) *n*-Butyl chloride b) sec-Butyl chloride
    c) Iso-Butyl chloride d) *tert*-Butyl chloride
11. The maximum possible oxidation state of the transition metal in 3d series is:
    a) +3 b) +6 c) +7 d) +8

Group 'B'

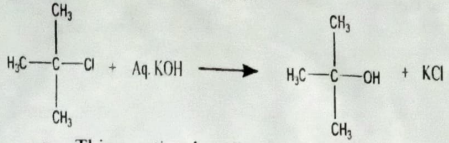
Answer the following: **[8×5= 40]**

1. i) Define acidity of a base. 200 mL of 0.2M HCl is neutralized with 0.1M NaOH. Then during their half neutralization, what is the molarity of HCl.
   ii) Calculate the rate of NH_3 and H_2O from the following reaction if the rate of formation of NO is 3.6×10^{-3} $mol\ L^{-1}S^{-1}$. [1+2+2]
   $4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$
2. The following data are given below in a reaction A+B → Product.

Experiments	[A] mol L^{-1}	[B] mol L^{-1}	Initial rate mol L^{-1} S^{-1}
1	0.1	0.1	4×10^{-4}
2	0.2	0.2	1.6×10^{-3}
3	0.5	0.1	1×10^{-2}
4	0.5	0.5	1×10^{-2}

   i) What is the order with respect to A and B for the reaction?
   ii) Calculate the rate constant.
   iii) Find the rate law.
   iv) Find the reaction rate when concentration of A and B are 0.2 $molL^{-1}$ and 0.35 $molL^{-1}$ respectively. [2+1+1+1]
3. What is normality factor? 1 g of mixture containing Mg and Zn required 72 mL of 1N HCl solution for complete neutralization. Find the percentage composition of mixture. (Atomic wt. of Zn= 65.4) [1+4]
4. An organic compounds (A) when heated with Ag power gives C_2H_2 and form carbonyl chloride when it exposes to air.
   i) Identify the compound (A)
   ii) Write reaction for the laboratory methods of preparation of (A)
   iii) What happens when the compound (A) is treated with conc. nitric acid.
   iv) Covert (A) into methanoic acid [1+2+1+1]
5. Write down the Monohydric isomers of C_3H_8O with their IUPAC names. Which one of them gives positive iodoform test? Write the reactions involved. Convert one isomer to another and vice verse. [2+1+2]

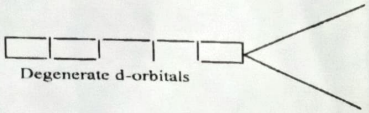
6. We have chemical reaction:



a. This reaction is called nucleophilic substitution reaction, why? [1]
b. Is this reaction following SN^1 or SN^2 mechanism? [0.5]
c. Give mechanism or reaction to justify answer of question number 'b'? [1.5]
d. What is difference in product if above reaction is carried out in presence of alcoholic KOH? Also state the type of reaction. [2]

7. Give two chemical reactions for the preparation of chlorobenzene. Why does it give ortho and para products during electrophilic substitution reaction? What happens when Chlorobenzene is treated with NH_3? [2+2+1]

8. One of the common features of transition elements is the formation of coloured compound.
a. Give name of five d-orbitals. [1]
b. Cu^+ ion is transition metal but can't possess colour, why? [1]
c. Complete given diagram. [1]



In octahedral complex

d. "Transition metal compound possess colour" explain on the basis of diagram from question 'c'. [2]

Group 'C'

Long question answers: **[8×3=24]**

1. A. i) Write down the two method of preparation of phenol. [2+1]
ii) What is Esterification? Define with reaction.

B. A monohydric alcohol reacts with PBr_3 to give 'B'. The compound B, if heated with alc. KOH gives 'C'. C on ozonolysis produces ethanal and methanal as major products. The compound "A" responses iodoform test. Identity A, B and C with reactions involved. What happens when "B" is heated with sodium in presence of dry ether? [5]

OR

An alcohol (P) having molecular formula $C_4H_{10}O$ undergoes victor Meyers test to give blue colour at the end of reaction when added KOH solution.
i) Draw structure formula and write IUPAC name of P. [1]
ii) Write down complete chemical reaction for the victor meyer test of P. [2]
iii) How would you prepare (P), starting form CH3MgBr? [2]
iv) What product would you obtain when P is oxidized? [1]
v) Convert propan-1ol into propan-2-ol [2]

2. A. Distinguish between order and molecularity. Derive integrated rate law equation for first order. [2+2]

B. 0.8 g of a divalent metal was dissolved in 100 cc of 1.28 N HCl solution and the solution is diluted to 200 cc. Then, 50 cc of this diluted solution requires 54.6 cc of 0.22 N NaOH for neutralization. Find the atomic wt. of metal. [4]

OR

i) Define pseudo first order reaction with example. [1]
ii) Why is half-life period of zero order reaction dependent of the initial concentration? [2]
iii) Calculate the half life period of a first order reaction when the rate constant is 5 $year^{-1}$. [1]
iv) A first order reaction is 99% complete in 32 minute.
a) Find out the rate constant and half life period. [2]
b) Calculate the time required to convert 99.1% of the reactant into products. [1]
v) Draw the energy profile diagram which gives the relationship between rate of reaction and Catalyst. [1]

3. Copper is reddish brown coloured solid, also 'Tama' in Nepal and used to prepare household utensils.
A. Starting from copper pyrite, how would you obtain pure copper? Explain the steps involved in the process with necessary diagram for it. [6]
B. What happens when:
a. A copper coin is dropped into concentrated H_2SO_4 in a test tube. [1]
b. Copper is exposed to moist air. [1]

'Good Luck'