HALF YEARLY EXAM. 2018-2019
SUBJECT : CHEMISTRY
CLASS : XII

Time : 3.00 hours

MM: 70

GENERAL INSTRUCTIONS:

(i) There are a total of 27 questions. All questions are compulsory.

(ii) Question number 1 to 5 are very short answer type questions of one mark each.

(iii) Question number 6 to 12 are short answer type I questions of two marks each.

(iv) Question number 13 to 24 are short answer type II Questions of three marks each.

(v) Question number 25 to 27 are long answer type questions of five marks each.

(vi) There is no overall choice in the question paper. However, an internal choice is provided in one question two marks, one question in three marks and all three questions of five marks. An examinee has to attempt and one of the questions out of the two given in the question paper with the same question number.

[P.T.O.]

1. Which type of crystal defect is produced when NaCl is doped with $MgCl_2$?   (1)

2. Why are powdered substances more effective adsorbent than their crystalline form?   (1)

3. Comment CO is a stronger ligand than Cl^-.   (1)

4. Allyl chloride is hydrolysed more readily than n-propyl chloride. Why?   (1)

5. Identify the order of reaction from the following unit of rate constant l/mol /s.   (1)

6. State Henry's Law. What is the significance of K_H?   (2)

7. The rate constant for a first order reaction is $60 \ s^{-1}$. How much time will it take to reduce the initial concentration of reactant to 1/10 th of its initial value.   (2)

OR

For a reaction $A \rightarrow B$ the rate of a reaction becomes 27 times when the concentration of A is increased three times. What is the order of the reaction?

8. Write balanced chemical reaction for the following   (2)

   i) $XeF_2 + PF_5 \longrightarrow$

   ii) $Cl_2 \ (g) + NaOH \ (aq) \xrightarrow{\text{(hot and conc)}}$

9. Account for the following :   (2)

   (i) The enthalpy of atomization is lowest for Zn in 3d series of transition elements.

   (ii) Actinoids elements show wide range of oxidation state.

[P.T.O.]

10. How are the following conversions carried out (2)

    (i)   Phenol to salicylic acid

    (ii) Propene to propan-2-ol

11. Give reason for the following: (2)

    (i)   Aniline does not undergo Friedal craft reaction

    (ii) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.

12. Arrange the following: (2)

    i)   Increasing order of basic strength.

          Aniline, p-nitro aniline, toluidine

    ii)   Increasing order of solubility in water

          Aniline, diethyl amine, ethyl amine

13. Chromium crystallizes in bcc structure if its atomic diameter is 245 pm. Find its density. Given: atomic mass of $Cr = 52u$, $N_A = 6.02 \times 10^{23}$ (3)

14. Calculate the boiling point of solution when 2 g of Na_2SO_4 (M= 142 g/mol) was dissolved in 50 g of water. Assuming Na_2SO_4 undergoes complete dissociation. (K_b for water = 0.52 K kg /mol). (3)

15. Derive the integrated rate expression for first order kinetics. Justify the statement that half-life of first order reaction is independent of initial concentration of reactant. (3)

16. Define the following terms :

    (i)   Electrophoresis.

[P.T.O.]

(ii) Peptization.

(iii) Multimolecular colloid.

17. Answer the following (3)

(i) Write the principle of method used for refining of germanium.

(ii) What is the role of depressants in froth floatation process?

(iii) What is the role of NaCN in the extraction of gold from its ore?

18. Give reasons : (3)

(i) E^0 value of Mn^{3+}/Mn^{2+} couple is much more positive than that of Fe^{3+}/Fe^{2+}.

(ii) Sc^{3+} is colorless in aqueous solution whereas Ti^{3+} is coloured.

(iii) Complete the equation

$$Fe^{2+} + MnO_4^- + H^+ \rightarrow$$
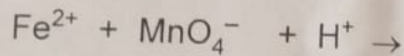
OR

Write the steps involved in the preparation of potassium dichromate from chromite ore.

19. Write the state of hybridization and magnetic character of following complexes

(3)

(i) $[Ni(CN)_4]^{2-}$

(ii) $[CoF_6]^{3-}$

(iii) $[Cr(NH_3)_6]^{3+}$

20. Give equation for the following :   (3)

 i) Bromine in CS_2 with phenol.

 ii) Dil HNO_3 with phenol.

 iii) Treating phenol with chloroform in the presence of aq NaOH.

21. Give reasons for the following :   (3)

 i) Dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.

 ii) Alkyl halide, though polar are immiscible with water.

 iii) Grignard reagent should be prepared under anhydrous condition.

22. Conductivity of 0.00241 M acetic acid solution is 7.89×10^{-5} cm^{-1}. Calculate its molar conductivity in this solution. If limiting molar conductivity of acetic acid is 390.5 S cm^2/mole. Also calculate degree of dissociation and dissociation constant of acetic acid.   (3)

23. State reason for each of the following :   (3)

 i) SF_6 is kinetically inert substance.

 ii) The N-O bond in NO_3^- is shorter than N-O bond in NO_2^-.

 iii) $R_3P=O$ exists but $R_3N=O$ does not. where R is an alkyl group.

24. Write the reaction involved in the following :   (3)

 i) Wolf-Kishner reduction.

 ii) Etard reaction.

(left margin fragments)

(3)

refining of

n process?

h of gold

(3)

ive than

Ti^{3+} is

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of

iii)   Aldol condensation.

25. (i)   Arrange the following in the increasing order of property indicated :   (5)

     (a) NH_3, PH_3, AsH_3, SbH_3, BiH_3 (increasing order of basic strength)

     (b) H_2O, H_2S, H_2Se, H_2Te (increasing order of acid strength)

     (c) F_2, Cl_2, Br_2, I_2 (increasing bond dissociation enthalpy)

 (ii)   Describe the structure of following

     (a) ClF_3

     (b) XeO_3

OR

(i)   Give reason for the following

     a)   ICl is more reactive than I_2.

     b)   Helium is used in diving apparatus

     c)   Nitric oxide becomes brown when released in air

 (ii)   Complete the following reactions

     a) $P_4 + NaOH + H_2O \rightarrow$

     (b) $H_3PO_3 \xrightarrow{\text{(Heat)}}$

26. (a)   Give chemical test to distinguish between the following pair   (5)

     (i)   propanol and propanone

     (ii)   phenol and benzoic acid

(iii)   pentan-2-one and pentan-3-one

(b)   Arrange the following in the increasing order of property indicated

(i) CH_3CHO, CH_3CH_2OH, CH_3OCH_3, $CH_3CH_2 CH_3$ (boiling point)

(ii) FCH_2COOH, $ClCH_2COOH$,$BrCH_2COOH$ (Acidic strength)

OR

An organic compound X having molecular formula C_4H_8O gives orange red ppt with 2,4 DNP reagent. It does not reduces Tollens's reagent but gives yellow ppt of iodoform on heating with NaOl. Compound X on reduction with $LiAlH_4$ gives compound Y which undergoes dehydration reaction on heating with conc. H_2SO_4 to form but-2-ene. Identify the compound X and Y and explain the reactions.

27. I) Define the following terms   :(5)

a)   limiting molar conductivity

b)   fuel cell

II)   Calculate emf and $_\Delta G$ for the following cell, at 298K

Mg(s) /Mg^{2+} (.01M) // Ag^+(.0001M) /Ag (s)

Given $E^0_{Mg2+/Mg}$ = -2.37V

$E^0_{Ag+/Ag}$ = 0.80 V

OR

i)   Account for the following:

a)   Alkaline medium inhibits the rusting of iron.

[P.T.O.]

(Left margin, partially visible)
order of property
(5)
ing order of basic
order of acid
tion enthalpy)

b)   Conductivity of the solution decrease with dilution.

ii)   Calculate the time to deposit 1.27 g of Cu at cathode when a current of 2A was passed through the solution of $CuSO_4$.

(Molar Mass of Cu=63.5g/mol, 1F =96500C/mol)

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