Pre Board Examination-1 -2019-20

Subject – Chemistry

Class 12   Marks – 70

Date: -- December 2019   Time –3 hrs

General Instructions:

1. This paper consists of 6 printed pages and there are 37questions in all.

2. **All Questions are compulsory**.

3. Section A: Question Numbers 1-20 are for 1 mark.

4. Section B: Question Numbers 21-27 are for 2 marks.

5. Section C: Question Numbers 28-34 are for 3 marks.

6. Section D: Question Numbers 35-37 are for 5 marks.

7. There is no overall choice. However, an internal choice has been provided in one question of two marks, two questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.

8. Use log tables if necessary, use of calculators is not allowed.

9. Show all calculations neatly.

SECTION : A

Read the given passage and answer the questions 1 to 5 that follow

Galvanic cell is the cell in which electricity is produced as a result of chemical reaction. Daniel cell is an example of galvanic cell. It consists of a zinc rod dipped in 1M zinc sulphate solution and a copper rod in 1M copper sulphate solution. Both the solutions are connected by an electric circuit and a salt bridge $E^o_{(Zn^{2+}/Zn)}$ = -0.76V, $E^o(Cu^{2+}/Cu)$= +0.34 V.

1	What will be the polarity of the electrodes in the Daniel cell?	1
2	Write the reactions that occur at anode and cathode.	1
3	Write the reactions occurring at the electrodes when Zn^{2+}/Zn is coupled with SHE.	1
4	Out of Cu and Zn which of them is a stronger reducing agent? Why?	1
5	Calculate E^0cell of Daniel cell.	1

Question numbers 6 to 10 are of one word answers.

6   Name the method of refining to obtain silicon of high purity.   1

7   Which component of starch is a branched polymer of D-glucose and   1
    insoluble in water?

8   Name a synthetic polymer which is an ester.   1

9   Which class of drugs is used in sleeping pills?   1

10 Which aldehyde does not give Fehling's solution test?   1

Question numbers 11 to 15 are multiple choice questions:

11 Chlorobenzene is formed by reaction of chlorine with benzene in the   1
    presence of $AlCl_3$. Which of the following species attacks the benzene
    ring in this reaction?
        a. Cl^- b. $AlCl_3$ c. $[AlCl_4]^-$ d. Cl^+

12 The oxidation number of Cobalt in $K[Co(CO)_4]$ is   1
        a. +1   b. +3   c. -1   d. -3

13 Which of the following is value of 'i' for K_2SO_4 if it is 95% ionized?   1
        a. 3   b. 2.90   c. 2.95   d. 3.05

14 Which of the following is used to reduce melting points of alumina   1
    and increase electrical conductance in extract of aluminium?
        a. NaF   b. Na_3AlF_6 c. $CaCl_2$ d. NaCl

15 Density of 3M NaCl solution is 1.25 g/cm^3. The molality of solution is   1
        a. 2.8m   b. 0.28m   c. 1.28m   d. 3.85m

**In the following questions a statement of assertion followed by a
statement of reason is given. Choose the correct answer out of the
following choices.**
a. Assertion and reason both are correct statements and reason is correct
explanation for assertion.
b. Assertion and reason both are correct statements, but reason is not
correct explanation for assertion.
c. Assertion is correct statement, but reason is wrong statement.
d. Assertion is wrong statement, but reason is correct statement.

16 Assertion : Glycine must be taken through diet.   1
    Reason   : It is a non essential amino acid .

17 Assertion : It is difficult to replace chlorine by –OH in chlorobenzene   1
                in comparison to that in chloroethane.
    Reason   : Chlorine-carbon bond in chlorobenzene has a partial
                double bond character due to resonance.

18 Assertion : NaCl reacts with concentrated H_2SO_4 to give colourless   1
                fumes with pungent smell. But on adding MnO_2 the fumes

become greenish yellow.

Reason : MnO_2 oxidises HCl to chlorine gas which is greenish yellow.

19 Assertion : The α-hydrogen atom in carbonyl compounds is less acidic.

Reason : The anion formed after the loss of α hydrogen atom is resonance stabilised.

1

20 Assertion : Nylon 6,6 > polythene > Buna-s is order of force of attraction.

Reason : Fibres have strong forces of attraction than thermoplastics and elastomers have weak intermolecular forces of attraction.

1

SECTION : B

21 How do you account for the following :
   a. Sulphur in vapour state exhibits paramagnetism.
   b. Enthalpy of dissociation for F_2 is much less than that of Cl_2.

2

22 Draw the plot of ln K vs 1/T for a chemical reaction. What does the intercept represent? What is the relationship between slope and E_a?

2

23 What is Van't Hoff factor? What types of values can it have if in forming the solution the solute molecules undergo i. Dissociation ii. Association?

2

24 Predict the products of the following reactions:

   a. C_6H_5-CO-CH_3 $\xrightarrow{NaOH/I_2}$

   b. CH_3COONa $\xrightarrow{NaOH/CaO}$

2

25 Name the following coordination compounds :
   a. [$CoCl_2(en)_2$]Cl
   b. [Pt $(NH_3)_2$Cl(NO_2)]

2

26 Describe the role of the following:
   a. SiO_2 in the extraction of copper from copper matte.
   b. NaCN in froth floatation process.

OR

Wrought iron is the purest form of iron. Write a reaction used for the preparation of wrought iron from cast iron. How can the impurities of sulphur, silicon and phosphorous be removed from cast iron?

2

27 An organic compound 'A' having molecular formula C_4H_8 on treatment with dil.H_2SO_4 gives 'B'. 'B' on treatment with conc. HCl and anhydrous $ZnCl_2$ gives 'C' and on treatment with sodium ethoxide gives back 'A'. Identify the compounds 'A' , 'B', and 'C' . Write the equation involved in the conversion of B to C.   2

SECTION C

28 Calculate the amount of sodium chloride which must be added to one kilogram of water so that the freezing point of water is depressed by 3 K.[Given : k_f = 1.86 K kg mol^{-1}, atomic mass : Na=23 u, Cl= 35.5u]   3

29 Consider the reaction: $2A + B \rightarrow C + D$ 3
Following results were obtained in experiments designed to study the rate of reaction:

Exp No	Initial concentration (mol/L)		Initial rate formation
	[A]	[B]	[D](M/min)
1	0.10	0.10	1.5×10^{-3}
2	0.20	0.20	3.0×10^{-3}
3	0.20	0.40	6.0×10^{-3}

a. Write the rate law for the reaction.
b. Calculate the value of rate constant for the reaction.

OR

a. How does catalyst affect the rate of reaction?
b. Time required for a particular reaction to be half completed is 693 seconds. Calculate the time required for 90% completion of this reaction.
c. What is meant by pseudo first order reaction?

30 Give reasons for the following observations: 3
a. A delta is formed at the meeting point of sea water and river water.
b. NH_3 gas adsorbs more readily than N_2 gas on the surface of charcoal.
c. Powdered substances are more effective adsorbents.

31 a. Draw the geometrical isomers of complex $[Pt(NH_3)_2Cl_2]$.   3
b. On the basis of crystal field theory, write the electronic

configuration for d^4 ion if $\Delta_o < P$.

c. Write the hybridization, shape, colour and magnetic behavior of the complex $[Ni(CN)_4]^{2-}$. (atomic mass of Ni=28)

33 Write the mechanism of the following reaction: 3

$$2CH_3CH_2OH \xrightarrow{H+} CH_3CH_2\text{-}O\text{-}CH_2CH_3$$
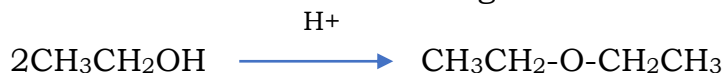
33 Write the chemical equation to illustrate the following name reactions: 3
    a. Wolff-Kishner reaction
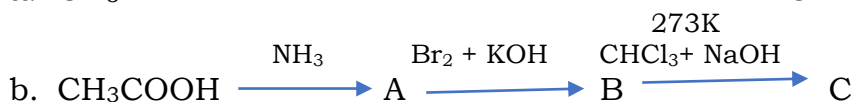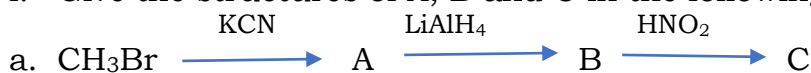   b. Aldol condensation
    c. Cannizzaro reaction

OR

An organic compound A having the formula , C_3H_8O, on treatment with copper at 573K, gives B. B does not reduce Fehling's solution but gives yellow precipitate of the compound C with $I_2/NaOH$. Deduce the structures of A, B and C. Write its corresponding equation.

34 Mention one use of the following drugs: 3

    a. Ranitidine   b. Paracetamol   c. Tincture of iodine
    d. Chloroxylenol   e. Aspirin   d. Norethindrone

SECTION D

35   i. Give the structures of A, B and C in the following reactions: 5

    a. $CH_3Br \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow{HNO_2} C$

    b. $CH_3COOH \xrightarrow{NH_3} A \xrightarrow{Br_2 + KOH} B \xrightarrow[273K]{CHCl_3 + NaOH} C$

    ii. Arrange the following :
    a. $C_2H_5NH_2$, C_2H_5OH, $(CH_3)_3N$ – in increasing order of boiling point.
    b. Aniline, p-nitro aniline, p-methyl aniline – in increasing order of their basic strength.

OR

A compound 'A' of molecular formula $C_3H_7O_2N$ on reaction with Fe and conc.HCl gives a compound 'B' of molecular formula C_3H_9N. Compound 'B' on treatment with $NaNO_2$ and HCl gives another compound 'C' of molecular formula C_3H_8O. The compound 'C' gives effervescence with Na. On oxidation with CrO_3, the compound 'C' gives a saturated aldehyde containing three carbon atoms. Deduce

the structures of A, B and C and write the equations
for the reactions involved.

36   i. Complete the following equations: 2
         a. $Cr_2O_7^{2-}$ + 2 OH$^-$ →
         b. MnO_4^- + 4 H$^+$ + 3 e$^-$ →
    ii. Account for the following:
         a. Zn is not considered a transition element.
         b. The Chemistry of actinoids is more complicated as   3
             compared to lanthanoids.
         c. The colour of KMnO$_4$ disappear when oxalic acid is added
             to its solution in acidic medium.

OR

A violet coloured compound of manganese (A) decomposes on heating
to liberate oxygen and compounds (B) and (C) of manganese are
formed. Compound(C) reacts with KOH in the presence of potassium
nitrate to give compound (B). On heating compound (C) with conc.
H_2SO_4 and NaCl, chlorine gas is liberated and a compound (D) of
manganese along with other products are formed. Identify compound
(A) to (D) and also explain the reactions involved.

37   i. Account for the following: 3
    a. Bond angle in H_2O is greater than H_2S.
    b. Bleaching of flowers by Cl_2 is permanent while that by SO_2 is
        temporary.
    c. Halogens are strong oxidising agents.
    ii. Draw the structure of ClF$_3$, XeOF$_4$.   2

OR

    i. Complete the following reactions:
    a. $F_{2(excess)}$ + Cl_2 →
    b. XeF_4 + O_2F_2 →
    c. Cl_2 +   NaOH(hot and conc) →
    ii. Describe the contact process for the manufacture of
         Sulphuric acid with special reference to reaction conditions,
         catalyst and the yield in the process.

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