## Pre Board -1 Examination – December 2019

**Roll No.**

**Series  SSR / 1**                                      **Code No. 043/ 1 / 1**

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- Please check that this question paper contains 7 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 37 questions.
- Please write down the serial number of the question before attempting it.

**Chemistry**

Class : XII                                             Time allowed :  3  hrs.
Date :  03-12-2019                                      Max marks :  70

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General Instructions:
(i)     All questions are compulsory.
(ii)    Section A : Question numbers 1 to 20 are very short answer questions(objective type) and carry 1 mark each.
(iii)   Section B : Question numbers 21 to 27 are short answer questions and carry 2 marks each.
(iv)    Section C : Question numbers 28 to 34 are long answer questions and carry 3 marks each
(v)     Section D : Question numbers 35 to 37 are also long answer questions and carry 5 marks each.
(vi)    There is no overall choice. However an internal choice has been provided in 2 questions of two marks , 2 questions of three marks and all the 3 questions of five marks weightage. You have to attempt only one of the choices in such questions.
(vii)   Use log tables if necessary, use of calculators is not allowed.

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### SECTION A

Read the given passage and answer the questions 1 to 5 that follows.

Sulphuric acid is an oxoacid of sulphur. It is one of the most important industrial chemicals in the world. A nation's industrial strength can be judged by the quantity of sulphuric acid it produces and consumes. It is prepared by Contact process by oxidizing sulphur to $SO_2$ and then to $SO_3$.

1.     What are the conditions required to increase the yield of sulphuric acid in this process?

2.     Why is Ka2 << Ka1 for $H_2SO_4$ in water?

3. What happens when $H_2SO_4$ is added to $CaF_2$?

4. Draw the structure of $H_2SO_4$

5. Why $H_2SO_4$ is not prepared by dissolving $SO_3$ in water in Contact process?

   Questions 6 to 10 are one word answers

6. Out of $BaCl_2$ and KCl, which one is more effective in causing coagulation of negatively charged colloidal sol?

7. What is the type of the charge on AgI colloidal sol formed when $AgNO_3$ is added to excess KI solution.

8. Give one example of Oil in water emulsion.

9. Write the dispersed phase and dispersion medium of smoke.

10. Give one example of shape selective catalyst.

    Questions 11 to 15 are multiple choice questions

11. The hydrogen electrode is dipped in a solution of pH =3 at 298K. The potential of the electrode would be

    (a) 0.177V    (b) 0.087V   (c) -0.177V   (d) 0.059V

12. An electrochemical cell can behave like an electrolytic cell when

    (a) Ecell = 0   (b) Ecell > E ext   (c) Ecell < E ext   (d) Ecell = E ext

13. The compound that causes general antidepressant action on the cenral nervous system belongs to the class of

    (a) Analgesics (b) Tranquilizers (c) narcotic analgesics (d) Antihystamines

14. Which of the following statements is correct

    (a) Some tranquilizers function by inhibiting the enzymes which catalyse the degredation of noradrenalin

    (b) Tranquilizers are narcotic drugs

    (c) Tranquilizers are chemical compounds that do not affect the message transfer from nerve to receptor

    (d) tranquilizers are chemical compounds that can relieve pain and fever

15. Which one of the following on reduction with $LiAlH_4$ yields a secondary amine

    (a) Methyl isocyanide (b) Acetamide (c) Methyl cyanide (d) Nitroethane

Question 16 to 20 :

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements and 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 : Formaldehyde is a planar molecule

    Reason    : It contains $sp^2$ hybridised carbon atom.

17. Assertion : Boiling points of alcohols and ethers are high

    Reason    : They can form hydrogen bonding.

18. Assertion : Phenol undergoes Kolbe's reaction but ethanol does not.

    Reason    : Phenol is more acidic than ethanol.

19. Assertion : The C—O—C bond angle in ethers is higher than H—O—H bond angle in water.

    Reason    : Oxygen in both ethers and water is $sp^3$ hybridised.

20. Assertion : In monohaloarenes, further electrophilic substitution occurs at ortho and para positions.

    Reason    : Halogen atom is a ring deactivator.

### SECTION B

21. What is meant by negative deviation from Raoult's law? Draw a diagram to illustrate the relationship between vapour pressure and mole fraction of components in a solution to represent negative deviation.

22. (a) Arrange the following in decreasing order of their basic strength:

    $C_6H_5NH_2$, $C_2H_5NH_2$, $(C_2H_5)_2NH$, $NH_3$

    (b) Convert : Ethanoic acid to methanamine

                OR

(a) What is the role of $HNO_3$ in the nitrating mixture used for the nitration of benzene.

(b) Methylamine in water reacts with ferric chloride to precipitate hydrated ferric oxide. Explain.

23.  Draw structures of the following:     (a) $HOBrO_2$        b) $XeO_3$

24.  Write the formulas for the following complexes:

(a) tetraamminediaquacobalt(III) Chloride

(b) Potassium Hexacyanidoferrate(III)

25.  For a reaction :        $2NH_3 (g) \rightarrow N_2{}_{(g)} + 3H_2{}_{(s)}$

Rate = k

(i) Write the order and molecularity of this reaction.

(ii) Write the unit of k.

26.  Explain what happens when:

(a) An electrolyte is added to ferric hydroxide sol?

(b) Ferric chloride is added to freshly precipitated ferric hydroxide?

OR

Differentiate between:

(a) Physisorption and chemisorption.

(b) Coagulation and peptization.

27.  (a)Write chemical equation for Reimer - Tiemann reaction

(b) Why do we always use primary alkyl halide for Williamson synthesis?

### SECTION C

28.  100 g of liquid A (molar mass 140 g/mol) was dissolved in 1000 g of liquid B (molar mass 180 g/mol). The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 torr.

29.  a) A first order reaction takes 10 minutes for 25% decomposition. Calculate half-life for the reaction.

(b) According to collision theory rate = $P\ Z_{AB}\ e^{(-Ea/RT)}$. What is $e^{(-Ea/RT)}$ represents?

30. (a) Write the principle of method used for the refining of Zinc

(b) What is the role of CO in the metallurgy of Nickel?

(c) Write the principle of Leaching.

31. (a) For the complex $[Fe(CN)_6]^{3-}$, write the hybridization type, magnetic character and spin nature of the complex. (At. number : Fe = 26).

(b) Draw one of the geometrical isomers of the complex $[Pt(en)_2Cl_2]^{2+}$ which is optically active.

32. (a) Convert   a) Ethyl chloride to propanoic acid

b) Propene to propyne

(b) What are the uses of DDT

OR

(a) What are ambident nucleophile? Give one example

(b) Arrange the following compounds in the increasing order of boiling points

1- chloropropane, Isopropyl chloride, 1- chlorobutane

(c) Write the IUPAC name of the compound o-Br-$C_6H_4CH(CH_3)CH_2CH_3$

33. (a) Name the nitrogeneous base in which DNA differs from RNA.

(b) Name the vitamin whose deficiency causes bleeding gums.

(c) What is glycosidic linkage?

OR

(a) What are the product of hydrolysis of maltose

(b) How do you explain the presence of carbonyl group in glucose?

(c) What is native protein?

34. (a) Draw structures and name the monomers of the following polymers:

(i) Bakelite    (ii) Nylon 6

(b) Based on the molecular forces what type of polymer is neoprene?

## SECTION D

35. (a) Following reactions occur at cathode during the electrolysis of aqueous copper(II) chloride solution :

$$Cu^{2+} + 2e \rightarrow Cu \qquad E° = +0.34V$$

$$H^+ + 1e \rightarrow \frac{1}{2} H_2 \qquad E° = 0.00V$$
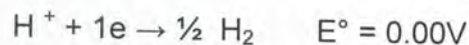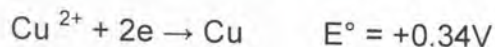
On the basis of their standard reduction electrode potential (E°)values, which reaction is feasible at the cathode and why ?

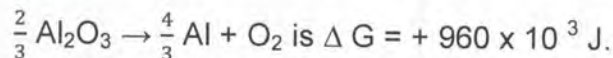(b) State Kohlrausch law of independent migration of ions. Write its one application.

(c) Calculate the EMF and ΔG for the reaction :

$$Mg + 2Ag^+ ( 0.001M) \rightarrow 2Ag + Mg^{2+} (0.01M)$$
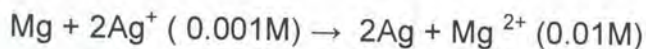
Given : $E^0 Mg^{2+}/Mg = -2.37V$ , $E^0 Ag^+/Ag = +0.80V$

OR

(a) Estimate the minimum potential difference needed to reduce $Al_2O_3$ at 500 °C. The free energy change for the decomposition reaction

$$\frac{2}{3} Al_2O_3 \rightarrow \frac{4}{3} Al + O_2 \text{ is } \Delta G = + 960 \times 10^{3} \text{ J.}$$

(b) Resistance of a conductivity cell filled with 0.1 mol $L^{-1}$ KCl solution is 100 Ω. If the resistance of the same cell when filled with 0.02 mol $L^{-1}$ KCl solution is 520 Ω, calculate the conductivity and molar conductivity of 0.02 mol $L^{-1}$ KCl solution. The conductivity of 0.1 mol $L^{-1}$ KCl solution is 1.29 S/m

36. (a) Describe

i) Wolff- Kishner reduction    ii) Gattermann-Koch reaction

(b) A compound A with formula $C_5H_{10}O$ gives a positive 2,4 DNP test but a negative Tollens test. It can be oxidised to carboxylic acid B of molecular formula $C_3H_6O_2$ when treated with Alk.$KMnO_4$ under vigorous conditions. The salt of B gives a hydrocarbon C on Kolbes electrolytic decarboxylation. Identify A,B,C and write chemical equations.

OR

(a) An organic compound A, which has a characteristic odour, on treatment with Con. NaOH forms two compounds B and C. Compound B has molecular formula $C_7H_8O$ which on mild oxidation gives back A. Compound C is the sodium salt of

an acid. C when heated with soda lime yields an aromatic hydrocarbon. Deduce the structures of A to D.

(b) Why carboxylic acid behave as fairly strong acid? What is the effect of substituent in the carbon chain on the acidic strength of carboxylic acid?

37. (a) Complete the following chemical equations for the reactions

i) $8MnO_4^- + 3S_2O_3^{2-} + H_2O \rightarrow$

ii) $Cr_2O_7^{2-} + 3H_2S + 8H^+ \rightarrow$
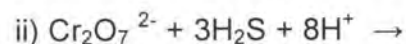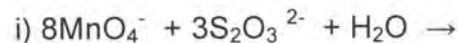
(b) Give an explanation for each of the following observations

i) The greatest number of oxidation states are exhibited by the members in the middle of the transition series

ii) With the same d- orbital configuration ($d^4$) $Cr^{2+}$ ion is a reducing agent but $Mn^{3+}$ is an oxidizing agent.
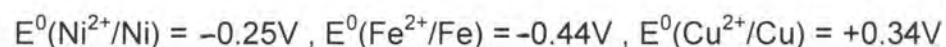
iii) The gradual decrease in size from element to element is greater in actinoids than that of lanthanoids.

OR

a) How do you prepare $KMnO_4$ from pyrolusite ore?

b) Zn is not considered as a transition element. Why?

c) Arrange the following ions in the increasing order of their stability of +2 charged ions

$E^0(Ni^{2+}/Ni) = -0.25V$ , $E^0(Fe^{2+}/Fe) = -0.44V$ , $E^0(Cu^{2+}/Cu) = +0.34V$

d) Which elements are known as coinage elements?

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