PRE-BOARD EXAMINATION- II- 2019-20

STD XII **CHEMISTRY (CODE-043)** **Marks: 70**

Time: 3 Hrs

General Instructions:-

(a) All questions are compulsory.

(b) Section A: Q.no. 1 to 20are very short answer questions (objective type) and carry 1 mark each.

(c) Section B: Q.no. 21 to 27 are short answer questions and carry 2 marks each.

(d) Section C: Q.no. 28 to 34 are long answer questions and carry 3 marks each.

(e) Section D: Q.no. 35 to 37 are also long answer questions and carry 5 marks each.

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

(g) Use of log tables if necessary, use of calculators is not allowed.

SECTION -A

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

Ethers are prepared in the laboratory using Williamson's synthesis. Both symmetrical and unsymmetrical ethers are prepared by this method. The reaction involves SN_2 attack on analkoxide ion on a primary alkyl halide. Better results are obtained if the alkyl halide is primary. In case of secondary and tertiary alkyl halides, elimination competes over substitution. It is because alkoxides are not only nucleophiles but strong bases as well. Ethers are least reactive functional groups. The cleavage of C-O bond in ethers takes place under drastic conditions with excess hydrogen halides. The reaction of alkyl halide gives two alkyl halides molecules. Alkyl aryl ethers yield phenol and alkyl halide.

(1) Name the alkyl halide and alkoxide suitable for the preparation of anisole. (1)

(2) Starting from ethanol and 3-Methylpentan-2-o1, how will you obtain 2-Ethoxy-3-methylpenatne? (1)

(3) Name the alkyl halide obtained when ethoxy benzene is treated with HBr. (1)

(4) Predict the products of the following reaction (1)

$(CH_3)_3C\text{-}OC_2H_5 + HI \rightarrow$

(5) Using curved arrows, show the step, that depicts bimolecular nucleophilic attack, in the mechanism of dehydration of ethanol to ether at 413K. (1)

Questions 6 to 10 are one word answers:

(6) What type of linkage is responsible for the primary structure of proteins? (1)

(7) Name the reagent used in Hinsberg's test for amines. (1)

(8) Name the catalyst used in the polymerization of ethene to give high density polyethene. (1)

(9) HF is a weaker acid than HCl. Why? (1)

(10) Which would undergo S_N2 reaction faster in the following pair and why? (1)
CH_3-CH_2-Br and CH_3-CH_2-I

Questions: 11 to 15 are multiple choice questions:

(11) Identify achiral compound from the following (1)

a) Butan-2-ol b) 2-Ch1orobutane c) Propan-2-ol d) 2-Bromopropanoic acid.

(12) How many Faradays of charge is required for the reduction of one mole of MnO_4^- to Mn^{2+}? (1)

a) 5F b) 3F c) 2F d) 7F

(13) Among the following identify the most basic amine in aqueous solution (1)

a) NH_3 b) b) $(CH_3)_3N$ c) $(CH_3)\ NH_2$ d) $(CH_3)_2NH$

(14) Which among the following doesn't answer Fehling's test? (1)

a) Propanal b) Benzaldehyde c) Ethanal d) Butanal

(15) Which among the following is a homopolymer? (1)

a) Nylon 6,6 b) Dacron c) Teflon d) Melamine

Questions: 16 to 20

(A)Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

(B) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

(C) Assertion is correct, but reason is wrong statement.

(D)Assertion is wrong, but reason is correct statement.

(16)**Assertion:**Van't Hoff factor for ethanoic acid in benzene is less than one. (1)

Reason: Ethanoic acid undergoes association in benzene.

(17)**Assertion:**Acetaldehyde undergoes Cannizaro reaction. (1)

Reason: Cannizaro reaction is shown by aldehydes that does not contain α-hydrogen atom.

(18)**Assertion:**Amino acids exist as zwitter ions. (1)

Reason: Amino acids are colorless, crystalline solids.

(19)**Assertion:**Carboxylic acids contain a carbonyl group but do not give (1)

characteristic reactions of carbonyl group.

Reason: The electrophilic nature of the carbonyl group is reduced due to resonance in carboxylicacid when compared to aldehydes or ketones.

(20) **Assertion:**Gabriel phthalimide reaction is suitable for preparation of primary (1)

alkyl amines.

Reason: Alkyl amines do not undergo nucleophilic substitution reaction with phthalimide ion.

SECTION-B

(21)State Henry's law and mention two of its important applications. (2)

(22) (a) Define limiting molar conductivity of an electrolyte. (2)

(b) How does molar conductivity change with dilution for a weak electrolyte?

(23) Differentiate between order and molecularity of a reaction. [2 points each] (2)

OR

What do you understand by a pseudo first order reaction? Give an example of Pseudo first order reaction and write the rate equation for the same.

(24) Explain the following terms: (2)

(i) Electrophoresis

(ii) Coagulation

OR

Account

a) The reduction of metal oxide is easier if the metal formed is in the liquid state at the temperature of reduction.

b) Silica is added to sulphide ore of copper during the extraction of copper.

(25) Account (2)

a) Grignard reagents are prepared in anhydrous conditions.

b) p- dihalo benzenes have higher melting points

(26) a) Write the IUPAC name of $C1CH_2C \equiv CCH_2Br$ (2)

b) Draw the structure of 2-(2-bromophenyl) butane.

(27) a) Illustrate Hell-Volhard-Zelinsky reaction. (2)

b) Which is more acidic and why: 4-Methoxy benzoic acid or 4-Nitro benzoic acid?

SECTION-C

(28) Give reasons for the following: (3)

A solution is prepared by dissolving 8.95mg of a gene fragment in 35 ml of water has an osmotic pressure of $4x10^{-4}$atm at 25^0C.Assuming the gene fragment is a non-electrolyte, determine its molar mass.[Given R= 0.0821 L atm/K/mol]

OR

A solution is made by dissolving 30g of a non-volatile solute in 90g of water. It has a vapourpressure of 2.8kPa at 298K.Calculate the molar mass of the solute. [Given vapour pressure of pure water at 298K is 3.64kPa]

(29) (a) Calculate the potential for half-cell containing 0.10M aqueous potassium dichromate, 0.20M aqueous Cr^{3+} and $1.0x10^{-4}$ M aqueous H^+. The half-cell reaction is (3)

$Cr_2O_7^{2-}(aq) + 14\ H^+(aq) + 6\ e^- \rightarrow 2Cr^{3+}(aq) + 7\ H_2O(l)$

and the standard electrode potential is given as $E^0 = 1.33$ V.

(30) i) How are XeO_3 and $XeOF_4$ prepared? (3)

ii) Why is $Ka_2 < Ka_1$ for H_2SO_4 in water?

iii) Draw the structures of a) H_2SO_4 b) $H_2S_2O_7$

(31) a) Convert the following to aniline i) Benzamide ii) Nitrobenzene (3)

b) Aniline does not undergo Friedel Craft's reaction. Why?

(32) What happens when D-glucose is treated with the following reagents? (3)

[Writereactions]-

a) Hydrogen iodide b) HCN c) conc.HNO_3

OR

Give one difference between the following:

i) Vitamin A and Vitamin B [solubility in fat]

ii) Globular protein and Fibrous protein [solubility in water]

iii) DNA and RNA [in the base unit]

(33) Write the IUPAC name of the following (3)

i) $[Co(NH_3)_6]Cl_3$
ii) $[NiCl_4]^{2-}$
iii) $K_3[Fe(CN)_6]$

(34) Explain with an example (3)

a) Narcotic analgesics b) Bactericidal antibiotics c) Antipyretics

SECTION-D

(35) (a) Show that in case of a first order reaction, the time required for99.9% of the reaction to take place is about ten times than required for half the reaction. (5)

b) A reaction was found to be zero order in A. In 8.33 seconds its initial concentration changed from 0.10M to 0.075M. Calculate rate constant and half-life of this reaction.

OR

(a)

The following results have been obtained during the kinetic studies of the reaction:

$2A + B \rightarrow C + D$

Experiment	A/ mol L^{-1}	B/ mol L^{-1}	Initial rate of formation of D/mol L^{-1} min^{-1}
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law and the rate constant for the reaction.

(b) The rate constant k of a reaction increases four times when the temperature changes from 300K to 320K.Calculate the activation energy for the reaction.

[Given: R=8.314 J/mol/K]

(36) a) Explain the preparation of potassium dichromate from chromite ore with equations. (5)

b) Assign reasons for the following:-

i) Transition metals and many of their compounds act as good catalyst.

ii) Zn, Cd and Hg are not regarded as transition metals.

OR

(i) Complete the following chemical equations:-

a. $MnO_4^-(aq) + C_2O_4^{2-}(aq) + H^+(aq) \rightarrow$

b. $MnO_4^-(aq) + I^-(aq) + H_2O(l) \rightarrow$

(ii) Explain giving reasons:-

a) Actinoids exhibit greater range of oxidation states than lanthanoids

b) Coupler (I) ion is not known in aqueous solution.

c) Cr^{2+} is reducing in nature while Mn^{3+} is an oxidising agent.

(37) a) Illustrate the following:- (5)

i) Etard's reaction

ii) Clemmensen's reduction

b) Give a chemical test to distinguish between ethanal and propanal.

c) How would you obtain the following

a. But-2-ena1 from ethanal

b. Benzoic acid from toluene

OR

a) What happens when [give chemical equations]:-

i) Benzene is treated with carbon monoxide and hydrogen chloride in the presence of anhydrous aluminum chloride.

ii) Benzoyl chloride is hydrogenated over catalyst palladium on Barium sulphate.

iii) Cyclohexanone is treated with hydroxylamine

b) Arrange the following in the increasing order of property mentioned in the bracket:

i) Ethanal, ethanol, methoxy methane, propane [boiling point]

ii) Ethanal, propanal, butanone, propanone [reactivity to nucleophilic addition reaction]