



INDIAN SCHOOL MUSCAT

FIRST PRE-BOARD EXAMINATION

CHEMISTRY

CLASS: XII

Sub. Code: 043

Time Allotted: 3 Hrs.

01.2020

Max. Marks: 70

General Instructions:

- All questions are compulsory.
- Marks for each question are indicated against it.
- Section A: Question numbers 1 to 20 are very short answer questions and carry 1 mark each.
- Section B: Question numbers 21 to 27 are short answer questions and carry 2 marks each.
- Section C: Question numbers 28 to 34 are also short answer questions and carry 3 marks each.
- Section D: Question numbers 35 to 37 are long answer questions and carry 5 marks each.
- There is no overall choice. But internal choice has been provided. You have to attempt only one choice in such questions.
- Use 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:

Group 17 elements, also known as halogens, comprises of F, Cl, Br, I and At. They are extremely reactive and show maximum oxidation state of +7. Like other members of p-block present in second period, fluorine in group 17 shows anomalous behaviour. Halogens combine with oxygen to form different oxides which are unstable. With Cl, Br and I the oxides exhibit oxidation states upto +7. Halogens form hydrogen halides which are acidic and the stability of these halides decreases down the group. Halogens combine among themselves to form reactive interhalogen compounds. Cl, Br and I form various oxoacids which are stable in aqueous solutions or in the form of their salts.

Arrange, hydrogen halides, in the increasing order of acid strength.

Why is fluorine stronger oxidizing agent than chlorine?

Draw the structure of chloric acid, HOCIO_2

Complete the reaction : $\text{Cl}_2 + \text{F}_{2(\text{excess})} \rightarrow \rightarrow$

What happens when chlorine is treated with hot concentrated sodium hydroxide?
[Give balanced equation]

Questions 6-10 are one word answers:

Write the IUPAC name of $\text{CH}_2=\text{CH}-\text{CH}(\text{C}_2\text{H}_5)-\text{C}(\text{Cl})=\text{CH}_2$

- 7 Name the type of deviation shown by a mixture of ethanol and acetone. 1
- 8 Name the oxometal anion of chromium that exhibits the oxidation state equal to its group number. 1
- 9 Name a reagent that converts allyl alcohol to propenal. 1
- 10 Name a substance that can be used as an antiseptic as well as disinfectant 1

Questions 11-15 are multiple choice questions:

- 11 Peptisation is a process of 1
- a) Purification of colloids b) Conversion of precipitate into a colloid
- c) Precipitation of a colloid d) Movement of a colloid under applied electric field
- 12 Barbiturates are used as 1
- a) Antihistamines b) analgesics c) antipyretic d) tranquilizers
- 13 A chemical test that can distinguish ethanamine and aniline is 1
- a) Carbylamine reaction b) Azodye reaction c) Hinsberg's reagent test d) Iodoform test
- 14 In denaturation of proteins, 1
- a) Primary structure is disturbed b) Primary and secondary structure is disturbed
- c) Secondary and tertiary structure is disturbed d) Primary and tertiary structure is disturbed
- 15 Which of the following is a step-growth polymer? 1
- a) Terylene b) Teflon c) polyacrylonitrile d) polyethene

Questions 16-20 are assertion & reasoning questions:

- (A) Both assertion and reason are correct statements, and the 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 [A]: Sulphide ores are concentrated by froth flotation process. 1
- [R]: In froth floatation process, pine oil preferentially wets the gangue particles.
- 17 [A]: Saccharin is an artificial sweetener. 1
- [R]: It gets metabolized in our body.
- 18 [A]: Galvanized iron does not rust. 1
- [R]: Zinc has a more negative electrode potential than iron.
- 19 [A]: SO_3 is not directly absorbed in water to form sulphuric acid. 1
- [R]: Sulphuric acid has high viscosity due to intermolecular hydrogen bonds.
- 20 [A]: Ti (IV) salts are colored. 1
- [R]: Ti (IV) salts do not have electrons in its d-orbital.

SECTION B

- 21 Describe the principle involved in 2
- a) Purification of germanium
- b) Electrolytic refining of metals

22 Differentiate between physisorption and chemisorption. [2points each] 2

OR

Explain how the process of adsorption finds application in

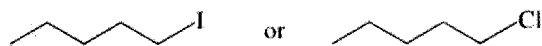
- a) Production of vacuum
b) Heterogeneous catalysis
- 23 How will you convert 2
- a) Benzene to acetophenone
b) Ethyne to ethanal
- 24 a) Write the formula for the following complex: Potassiumtetrachloridonickelate (II). 2
b) On the basis of crystal field theory, write the electronic configuration for d^4 ion if $\Delta_o > P$.
- 25 How are thermoplastics different from thermosetting polymers? Give an example for each. 2
- 26 Explain the following terms 2
- a) Tyndall effect
b) Kraft temperature
- 27 a) What is the structural difference between nucleoside and nucleotide? 2
b) What is meant by invert sugar?

OR

- i) Why should vitamin B and C be supplied regularly in diet?
ii) Glucose on reaction with HI gives n-hexane. What does it suggest about the structure of glucose?

SECTION C

28 a) Which among the following undergoes SN_2 faster and why? 3



- b) Give a chemical test to distinguish between Chloro benzene and benzyl chloride
c) What do you understand by the term enantiomer?

OR

Explain with equations

- i) Friedel Craft alkylation of Chloro benzene
ii) Nitration of Chloro benzene
iii) Halogenation of Chloro benzene
- 29 The rate constants of a reaction at 500K and 700K are $0.02s^{-1}$ and $0.07s^{-1}$ respectively. Calculate 3
activation energy E_a . [given $R=8.314J/K/mol$]
- 30 a) Write the IUPAC name of the complex $[Cr(NH_3)_4Cl_2]Cl$. 3
b) What type of isomerism is exhibited by the complex $[Co(en)_3]^{3+}$?
c) Why is $[NiCl_4]^{2-}$ paramagnetic whereas $[Ni(CO)_4]$ diamagnetic? [At no. Ni=28]
- 31 a) Write the chemical equations involved in the following reactions: 3
i) Hoffmann-bromamide degradation reaction ii) Carbylamine reaction
b) Convert aniline to benzene.

- 32 a) Write the reagent required for following reaction $\text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{CONH}_2$. 3
 b) Give a chemical test to distinguish between acetaldehyde and benzaldehyde.
 c) Why carboxylic acids are more acidic than phenols?
- 33 a) Write one similarity and one difference between the chemistry of lanthanoid and actinoid elements. 3
 b) Complete the following equation: $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow$

OR

- i) Although 'F' is more electronegative than 'O', the highest fluoride of manganese is MnF_4 , whereas the highest oxide is Mn_2O_7 . Give reason.
 ii) Complete the following equations:
 a) $2\text{CrO}_4^{2-} + 2\text{H}^+ \xrightarrow{\Delta}$
 b) $2\text{KMnO}_4 \xrightarrow{\Delta}$
- 34 a) Define rate constant of a reaction. 3
 b) The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at a constant volume

$$\text{SO}_2\text{Cl}_{2(\text{g})} \rightarrow \text{SO}_{2(\text{g})} + \text{Cl}_{2(\text{g})}$$

Experiment	Time/s ⁻¹	Total pressure/atm
1	0	0.4
2	100	0.7

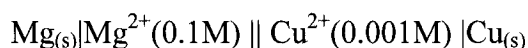
Calculate the rate constant. [Given: $\log 4 = 0.6021$, $\log 2 = 0.3010$]

SECTION D

- 35 a) Explain Lucas test for distinguishing primary, secondary and tertiary alcohols. 5
 b) Arrange the following in the increasing order of boiling points:
 pentanal, pentan-1-ol, ethoxyethane, butane
 c) Give equations for the following reactions:
 i) Reaction of phenol with Dilute HNO_3
 ii) Reaction of phenol with bromine water
 iii) Acetylation of Salicylic acid

OR

- i) What happens when
 a) cyclohexanol is treated with thionyl chloride b) ethoxy benzene is treated with HBr
 ii) Write the mechanism of acidic dehydration of ethanol to ethene at 443K.
- 36 a) Name the cell used in Apollo Space programme. 5
 b) The resistance of a conductivity cell containing 0.001 M KCl solution at 298 K is 1500Ω . What is the cell constant if the conductivity of 0.001 M KCl solution at 298K is $0.146 \times 10^{-3} \text{ S cm}^{-1}$?
 c) Calculate the emf of the following cell at 298 K



Given: $E^\circ_{\text{cell}} = +2.71\text{V}$, $1\text{F} = 96500\text{C/mol}$

OR

- i) Why does the voltage of a mercury cell remain constant during its operation?
- ii) The molar conductivity of a 1.5M solution of an electrolyte is found to be $138.9 \text{ Scm}^2 \text{mol}^{-1}$. Calculate the conductivity of this solution.
- iii) Calculate λ_m° for acetic acid. [Given $\lambda_m^\circ(\text{HCl}) = 426 \text{ Scm}^2 \text{mol}^{-1}$, $\lambda_m^\circ(\text{NaCl}) = 126 \text{ Scm}^2 \text{mol}^{-1}$, $\lambda_m^\circ(\text{CH}_3\text{COONa}) = 91 \text{ Scm}^2 \text{mol}^{-1}$]

37

- a) State Raoult's law
- b) Draw a diagram to illustrate the relationship between vapour pressure and mole fraction of components in a solution to represent negative deviation.
- c) 1.00g of non-electrolyte solute when dissolved in 50g of benzene lowered the freezing point of benzene by 0.40K. Find the molar mass of the solute. [K_f of benzene = 5.12 Kkg/mol]

OR

- i) Define a) colligative property b) molarity.
- ii) Calculate the depression in freezing point of an aqueous solution containing 10.50g of magnesium bromide in 200g of water. [Molar mass of magnesium bromide = 184g, K_f of water = 1.86 Kkg/mol]

End of the Question Paper