Roll Number		

SET A

INDIAN SCHOOL MUSCAT
FIRST PRE-BOARD EXAMINATION
CHEMISTRY

CLASS: XII | Sub. Code: 043 | Time Allotted: 3 Hrs.

06.01.2020 | 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 oxidations 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 inter halogen compounds. Cl, Br and I form various oxoacids which are stable in aqueous solutions or in the form of their salts.

1 Draw the structure of chloric acid,$HOClO_2$ 1

2 What happens when chlorine is treated with hot concentrated sodium hydroxide? [Give balanced equation] 1

3 Why is fluorine stronger oxidizing agent than chlorine? 1

4 Arrange, hydrogen halides, in the increasing order of acid strength. 1

5 Complete the reaction : $Cl_2 + F_{2(excess)} \rightarrow$ 1

Questions 6-10 are one word answers:

6 Name the type of deviation shown by a mixture of ethanol and acetone. 1

7 Name the oxometal anion of chromium that exhibits the oxidation state equal to its group number. 1

8 Name a substance that can be used as an antiseptic as well as disinfectant 1

9 Write the IUPAC name of CH_2=CH-CH(C_2H_5)-C(Cl)=CH_2 1

10 Name a reagent that converts allyl alcohol to propenal. 1

Questions 11-15 are multiple choice questions:

11 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

12 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

13 Which of the following is a step-growth polymer? 1

a) Terylene b) Teflon c) polyacrylonitrile d) polyethene

14 Barbiturates are used as 1

a) Antihistamines b) analgesics c) antipyretic d) tranquilizers

15 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

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]: Galvanized iron does not rust. 1
[R]: Zinc has a more negative electrode potential than iron.

17 [A]: Sulphide ores are concentrated by froth flotation process. 1
[R]: In froth floatation process, pine oil preferentially wets the gangue particles.

18 [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.

19 [A]: Ti (IV) salts are colored. 1
[R]: Ti (IV) salts do not have electrons in its d-orbital.

20 [A]: Saccharin is an artificial sweetener. 1
[R]: It gets metabolized in our body.

SECTION - B

21 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 Δ_o>P.

22 How will you convert 2
a) Benzene to acetophenone
b) Ethyne to ethanal

23 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

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

25 Explain the following terms 2
a) Tyndall effect
b) Kraft temperature

26 a) What is the structural difference between nucleoside and nucleotide? 2
b) What is meant by invert sugar?

OR

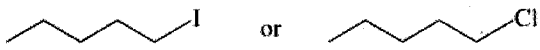
i) Why should vitamin B and C be supplied regularly in diet?
ii) Glucose on reaction with HI gives n-hexane. What does it suggest about the structure of glucose?

27 How are thermoplastics different from thermosetting polymers? Give an example for each. 2

SECTION C

28 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]

29 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

30 The rate constants of a reaction at 500K and 700K are $0.02s^{-1}$ and $0.07s^{-1}$ respectively. Calculate activation energy Ea. [given R=8.314J/K/mol] 3

31 a) Write one similarity and one difference between the chemistry of lanthanoid and actinoid elements. 3
b) Complete the following equation: $MnO_4^- + 8H^+ + 5e^- \rightarrow$

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) $2CrO_4^{2-} + 2H^+ \rightarrow$

b) $2KMnO_4 \xrightarrow{\Delta}$

32 a) Write the chemical equations involved in the following reactions: 3

i) Hoffmann-bromamide degradation reaction ii) Carbylamine reaction

b) Convert aniline to benzene.

33 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

$SO_2Cl_{2(g)} \rightarrow SO_{2(g)} + Cl_{2(g)}$

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]

34 a) Write the reagent required for following reaction $CH_3COOH \rightarrow CH_3CONH_2$. 3

b) Give a chemical test to distinguish between acetaldehyde and benzaldehyde.

c) Why carboxylic acids are more acidic than phenols?

SECTION D

35 a) State Raoult's law 5

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=5.12Kkg/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=1.86Kkg/mol]

36 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.

37 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 1500 Ω. What is the cell constant if the conductivity of 0.001 M KCl solution at 298K is 0.146×10^{-3} S cm^{-1}?

c) Calculate the emf of the following cell at 298 K

$Mg_{(s)}|Mg^{2+}(0.1M) \,||\, Cu^{2+}(0.001M)\,|Cu_{(s)}$

Given: E^{o}_{cell}=+2.71V, 1F=96500C/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 138.9Scm^2mol^{-1}. Calculate the conductivity of this solution.

iii) Calculate λ^{o}_{m} for acetic acid. [Given λ^{o}_{m} (HCl)=426 Scm^2mol^{-1} ,λ^{o}_{m} (NaCl)=126 Scm^2mol^{-1} ,λ^{o}_{m} (CH_3COONa)=91 Scm^2mol^{-1}]

End of the Question Paper