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**INDIAN SCHOOL MUSCAT
SECOND PRE-BOARD EXAMINATION
CHEMISTRY**

CLASS: XII

Sub. Code: 043

Time Allotted: 3 Hrs.

05.02.2020

Max. Marks: 70

General Instructions:

- a) All questions are compulsory.
- b) Section A: Q.no. 1 to 20 are objective type questions 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 also short answer questions and carry 3 marks each.
- e) Section D: Q.no. 35 to 37 are 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 questions of 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:

The p-block elements are found on the right side of the periodic table. Group 16 elements are called as chalcogens. Halogens are highly reactive elements having strong affinity for hydrogen. But noble gases are inert gases which are monoatomic. The compounds of xenon exhibit rich stereochemistry and their geometries can be explained on the basis of VSEPR theory as well as the concept of hybridization.

1. What happens when HCl is added to MnO_2 ? 1
2. XeF_6 on partial hydrolysis gives _____ 1
3. Give the name of a xenon compound which is isostructural with ICl_4^- . 1
4. What happens when SO_2 is passed through an aqueous solution of Fe(III) salt? 1
5. Draw the shape of BrF_5 using VSEPR theory. 1

Questions 6 to 10 are fill in the blanks

6. During the electrolysis of aqueous sodium chloride, oxidation of chloride ion is preferred at anode due to ____ 1

7. The equation for Freundlich adsorption isotherm is _____ 1
8. α -D-(+)-glucose and β -D-(+)-glucose are _____ 1
9. In the given reaction : 1
 $[A] + [B] \xrightarrow{NaOH/\Delta} C_6H_5-CH=CH-CHO$
 [A] and [B] will be _____ & _____
10. Antibiotic which is toxic towards cancer cells is _____ 1

Questions 11 to 15 are multiple choice questions.

11. According to Ellingham diagram, the oxidation reaction of carbon to carbon monoxide may be used to reduce which one of the following oxides at the lowest temperature? 1
 a) Al_2O_3 b) Cu_2O c) MgO d) ZnO
12. Which of the following 0.1 M aqueous solution will have lowest freezing point? 1
 a) Potassium Sulphate b) Sodium chloride c) Urea d) Glucose
13. During the process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud'. These are 1
 a) Sn and Ag b) Pb and Zn c) Ag and Au d) Fe and Ni
14. The final product formed in the reactions of toluene with chlorine gas in the presence of UV light is 1
 a) a mixture of o- and p- chlorotoluene b) m-chlorotoluene
 c) benzotrichloride d) benzoyl chloride
15. n-Propyl bromide on treatment with ethanolic potassium hydroxide produces 1
 a) propane b) propene c) propyne d) propanol

In the following Questions 16 to 20, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices

- a) Both Assertion and reason are correct
 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 : *ter*-Butyl methyl ether is not prepared by the reaction of *ter*-butyl bromide with sodium methoxide. 1
 Reason : Sodium methoxide is a strong nucleophile.
17. Assertion: N-Ethyl benzene sulphonamide is soluble in alkali. 1
 Reason: Hydrogen attached to nitrogen in sulphonamide is strongly acidic.
18. Assertion : The cell potential of mercury cell is 1.35V, which remains constant. 1
 Reason : In mercury cell, the electrolyte is a paste of KOH and ZnO .

19. Assertion: A gas with higher critical temperature gets adsorbed to more extent than a gas with lower critical temperature. 1
Reason: The easily liquefiable gases get adsorbed to more extent.
20. Assertion : Reactions of higher order are rare. 1
Reason: The chances of simultaneous multi molecular collisions are extremely small

SECTION B

21. Calculate the strength of the current required to deposit 1.2 g of magnesium from molten MgCl_2 in 1 hour. [1 F = 96,500 C mol^{-1} ; Atomic mass : Mg = 24u] 2
22. Equilibrium constant (K_c) for the given cell reaction is 10. Calculate E°_{cell} . 2
 $A(s) + B^{2+}(aq) \rightarrow A^{2+}(aq) + B(s)$
23. a) Write the IUPAC name of $[\text{CoCl}(\text{NO}_2)(\text{NH}_3)_4]\text{Cl}$ 2
b) Using IUPAC norms write the formula of the coordination compound Potassiumtetrachloridonickelate(II)
24. a) Write the structure of the product when Chlorobenzene is treated with chloromethane in presence of sodium metal and dry ether 2
b) The presence of nitro group ($-\text{NO}_2$) at *o/p* positions increases the reactivity of haloarenes towards nucleophilic substitution reactions.
25. a) Gas (A) is more soluble in water than gas (B) at the same temperature. Which one of the two gases will have the higher value of K_H and why? 2
b) What is Anoxia?
26. a) What is the role of Silica in the extraction of copper? 2
b) What is German silver?

OR

Explain the process of leaching of alumina from bauxite ore? Write the chemical equations involved

27. Account for the following 2
a) Metal hydroxides are better alternatives than sodium hydrogen carbonate for treatment of acidity.
b) The use of the sweetener aspartame is limited to cold foods and drinks

OR

Discuss the two ways in which drugs prevent attachment of natural substrate on active site of an enzyme.

SECTION C

28. a) Arrange the following compounds in the increasing order of acid strength 3
Ethanol, Phenol, p-nitro phenol, water
b) Write the mechanism for the following reaction
 $\text{CH}_3\text{CH}_2\text{OH} + \text{HBr} \rightarrow \text{CH}_3\text{CH}_2\text{Br} + \text{H}_2\text{O}$
29. Describe the following processes : 3
a) Dialysis
b) Electrophoresis
c) Zeta potential

30. The vapour pressure of pure liquids A and B are 450 and 700 mm Hg respectively, at 350 K. Find out the composition of the liquid mixture if total vapour pressure is 600 mm Hg. Also find the composition of the vapour phase. 3

OR

Two elements A and B form compounds having formula AB_2 and AB_4 . When dissolved in 20 g of benzene, 1 g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K. The molar depression constant for benzene is $5.1 \text{ K kg mol}^{-1}$. Calculate the atomic masses of A and B

31. Effect the following conversions 3
- Benzoic acid to Aniline
 - N-Phenylethanamide to p-Bromoaniline
 - Aniline to Phenol
32. a) Using valence bond theory of complexes, explain the geometry and magnetic nature of $[\text{Ni}(\text{CN})_4]^{2-}$ (At. no. of Ni = 28) 3
- b) Draw the structures of geometrical isomers of the coordination complex : $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$
33. a) Is $(-\text{NH}-\text{CHR}-\text{CO}-)_n$ a homo polymer or copolymer and why? 3
- b) Differentiate between the following polymers based on the property mentioned against each
- Novolac and Bakelite (Structure)
 - Buna S and Terylene (Mode of polymerisation)

OR

- a) What is the primary structural feature necessary for a molecule to make it useful in a condensation polymerisation reaction?
- b) Identify the monomers in the following polymer
- $$\left[\text{O}-\text{CH}_2-\text{CH}_2-\text{O}-\text{C}(=\text{O})-\text{C}_6\text{H}_4-\text{C}(=\text{O}) \right]_n$$
- c) Write the structures of the monomer of the polymer PHBV?
34. a) Give one example each for fibrous protein and globular protein. 3
- b) Name the products of hydrolysis of sucrose and why is sucrose not a reducing sugar?

SECTION D

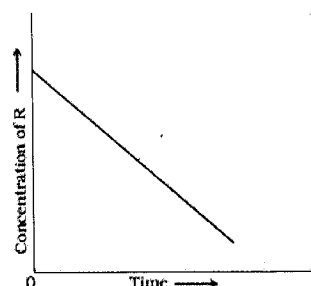
35. A violet compound of manganese (A) decomposes on heating to liberate oxygen and compounds (B) and (C) of manganese are formed. Compound (C) reacts with KOH in the presence of KNO_3 to give compound (B). On heating compound (C) with conc. H_2SO_4 and NaCl, Cl_2 gas is liberated and compound (D) of manganese is formed. Identify A, B, C, D along with reactions involved. 5

OR

- a) Account for the following
- $K_2Cr_2O_7$ show different colour in acidic and basic medium
 - Zr and Hf have almost same size.
- b) Following are the transition metal ions of 3d series:
 Ti^{4+} , V^{2+} , Mn^{3+} , Cr^{3+} (Atomic number: Ti = 22, V = 23, Mn = 25, Cr = 24).
- Which ion is most stable in an aqueous solution and why?
 - Which ion is a strong oxidising agent and why?
 - Which ion is colourless and why?

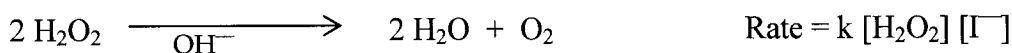
36. a) In some reactions, it is found that a large number of colliding molecules have energy more than threshold energy, yet the reaction is slow, why? 5
- b) Consider the reaction $A \rightarrow B$. The change in concentration with time is shown in the following plot.

- Predict the order of the reaction
- Derive the expression for the time required for the completion of the reaction.
- What does the slope of the above line indicate?



OR

- a) Using the rate law expression for the following reaction, predict the mechanism of the reaction.

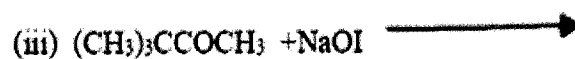
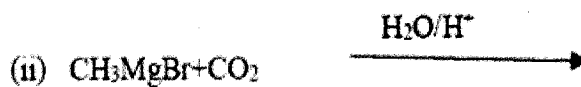
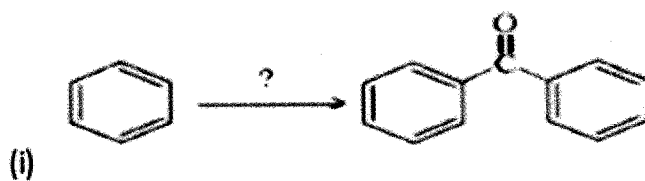


- b) A first order reaction has a rate constant value of 0.00510 min^{-1} . If we begin with 0.10 M concentration of the reactant, how much of the reactant will remain after 3.0 hours?

37. a) Write the chemical equations to illustrate the following name reactions : 5
- Stephen reaction
 - Hell-Volhard-Zelinsky reaction
 - Decarboxylation
- b) What is the IUPAC name of $m\text{-BrC}_6\text{H}_4\text{CH}_2\text{COOH}$
- c) What happens when acetophenone is treated with Zn/Hg and HCl.

OR

- Write the formula of the products formed when methanal reacts with con : NaOH.
- Draw the structural formula of Hex-2-en-4-ynoic acid
- Complete each synthesis by giving missing reagents or



products.

End of the Question Paper