

PRE-BOARD EXAMINATION-2 (JANUARY-2020)

CLASS: XII

CHEMISTRY

Time: 3 hrs.

MAX. MARKS: 70

General Instructions:

- All questions are compulsory.
- Section A: Q.no. 1 to 20 are very short answer questions (objective type) and carry 1 mark each.
- Section B: Q.no. 21 to 27 are short answer questions and carry 2 marks each.
- Section C: Q.no. 28 to 34 are long answer questions and carry 3 marks each.
- Section D: Q.no. 35 to 37 are long answer questions and carry 5 marks each.
- 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 choice in such questions.
- 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:

Mercury cells are suitable for low current devices like hearing aids, watches, etc. These are commonly called button cells. Most of the people buy watches having mercury cells but mercury cells have been banned in developed countries but still being used in India. Silver oxide cells are being used in these days.

Silver oxide batteries contain a flat circular cathode of silver oxide with a low percentage of MnO_2 and graphite and an anode of high surface area with zinc and alkaline electrolyte having KOH or NaOH.

- Why should silver oxide batteries be preferred over mercury cells? (1)
- What is shelf life of silver oxide cells? (1)
- Are silver oxide cells more expensive than mercury cells? Do you suggest them for use? Give reason. (1)
- What is the reaction at cathode in silver oxide cells? (1)
- What is the reaction at anode? (1)

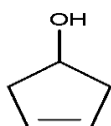
Questions 6 to 10 are one word answers:

- Which reducing agent is employed to get copper from leached low grade copper ore? (1)

- 7 Name the products of hydrolysis of
i) Sucrose and
ii) Lactose. (1)
- 8 Write such reactions and facts about glucose which cannot be explained by its open chain structure. (1)
- 9 Write the structure and one use of Bakelite. (1)
- 10 Which of the following is not a chiral?
2-Hydroxy propanoic acid, 2-Butanol, 3-Bromo pentane. (1)

Questions 11 to 15 are multiple choice questions.

- 11 The IUPAC name of the compound shown below is: (1)



- (a) 4-Cyclo pent-3-en -1-ol.
(b) Cyclopent-4-en-1-ol.
(c) 3-Cyclo pent-3-en-1-ol
(d) Cyclopent-3-en-1-ol
- 12 The correct IUPAC name of $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ is (1)
(a) Diammine dichlorido platinum(II)
(b) Diammine dichlorido platinum(o)
(c) Diammine dichlorido platinum(IV)
(d) Dichlorido diamine platinum(IV)
- 13 Crystal field stabilization energy for high spin d^4 octahedral complex is (1)
(a) $-0.6 \Delta_o$
(b) $-1.8 \Delta_o$
(c) $-1.6 \Delta_o + p$
(d) $-1.2 \Delta_o$
- 14 Formation of a complex in the solution can be detected by (1)
(a) change in colour
(b) change in solubility
(c) change in P^{H}
(d) all are correct
- 15 Which of the following are addition polymers? (1)
(a) Nylon
(b) Melamine formaldehyde resin
(c) Orlon
(d) Polystyrene

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 strong statement.
(D) Assertion is wrong, but reason is correct statement.
- 16 **Assertion:** Sucrose is a non reducing sugar. (1)
Reason: It has glycosidic linkage.
- 17 **Assertion:** Insulin is a globular protein (1)
Reason: Globular proteins are water soluble.
- 18 **Assertion:** HI cannot be prepared by the reaction of KI with concentrated H_2SO_4 (1)
Reason: HI has lowest H—X bond strength among halogen acids.
- 19 **Assertion:** The boiling points of alkyl halides decrease in the order (1)
 $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$
Reason: The boiling point of alkyl chlorides, bromides and iodides considerably higher than that of the hydro carbon of comparable molecular mass.
- 20 **Assertion:** Nitration of chloro benzene leads to the formation of m-nitro chloro benzene. (1)
Reason: NO_2 group is a meta directing group.

SECTION: B

- 21 (a) What is the basicity of H_3PO_3 and why? (2)
(b) Draw the structure of H_3PO_3 .
- 22 A first order reaction takes 100 minutes for completion of 60% of the reaction. Find the time when 90% of the reaction will be completed. (2)
- 23 Why do gases always tend to be less soluble in liquids as the temperature is raised? (2)
- 24 Write the structure of the product formed: (2)
(a) $(\text{CH}_3)_3\text{CBr} + \text{H}_2\text{O} \xrightarrow{\text{HEAT}}$
(b) $(\text{CH}_3)_2\text{CH} - \text{CH}(\text{Br})\text{CH}_2\text{CH}_3 \xrightarrow[443\text{K}]{\text{C}_2\text{H}_5\text{ONa}}$
- 25 Three geometrical isomers are possible for $[\text{Co}(\text{en})(\text{H}_2\text{O})_2(\text{NH}_3)_2]^{3+}$. Draw molecular structures of these three isomers and indicate which one of them is chiral. (2)

OR

Discuss the bonding in the coordination entity $[\text{Cr}(\text{NH}_3)_6]^{3+}$ on the basis of valence bond theory. Also comment on the geometry and spin of the given entity. (Atomic no. of Cr=24)

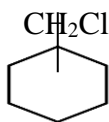
- 26 Explain Hall-Heroult process. (2)

OR

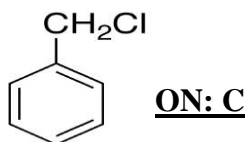
Write and explain the reactions involved in the extraction of gold.

27 Which of the following compounds would undergo S_N1 reaction faster and why? (2)

(a)



(b)



28 An aqueous solution freezes at 272.4K, while pure water at 273K. Determine the (i) molality of the solution, (ii) boiling point of solution, (iii) lowering of vapour pressure of water at 298K. (Given $K_f = 1.86 \text{ K kg mol}^{-1}$ and vapour pressure of pure water is 23.757 mm Hg) (3)

- 29 a) Define Half-life of a reaction. (3)
b) Show that in a first order reaction, time required for completion of 99.9% is 10 times of half life of the reaction.

OR

- a) The rate constant for a first order reaction is 60 s^{-1} . How much time will it take to reduce the initial concentration of the reactant to its $1/16^{\text{th}}$ value?
b) Define first order reaction.
- 30 a) What are the two types of emulsions and how do they differ from one another? Give one example of each. (3)
b) Which one of the following electrolyte is most effective for the coagulation of $\text{Fe}(\text{OH})_3$ sol and why? NaCl , Na_2SO_4 , Na_3PO_4

31 Account for the following: (3)

- (a) PCl_5 can act as an oxidizing agent but not as a reducing agent.
(b) Dioxygen is a gas but sulphur is a solid.
(c) Halogens are coloured.

32 Identify the product formed when ethanol is treated with $\text{Con. H}_2\text{SO}_4$ at 443K. Write the mechanism involved for the above reaction. (3)

- 33 (a) Give the chemical test to distinguish between the following pairs of compounds: i) Ethanol and Ethanal. ii) Phenol and Benzoic acid. (3)
(b) Arrange the following compounds in increasing order of their acid strength: Propan-1-ol, 2,4,6-trinitro phenol, 3-nitro phenol, 3,5-dinitro phenol, phenol, 4-methyl phenol.

OR

What is meant by the following terms? Give an example in each case.

- (a) cyano hydrin (b) Semicarbazone (c) Hemiacetal.

- 34 (a) Mention one important use of each of the following: (3)
i) Equanil ii) Sucralose
(b) Name a broad spectrum antibiotic and state two diseases for which it is prescribed.

SECTION: D

35 (a) Write the Nernst equation and emf of the following cells at 298K. (5)
 $\text{Sn(s)}/\text{Sn}^{2+}(0.050\text{M})//\text{H}^+(0.020)/\text{H}_2(\text{g})(1\text{bar})/\text{Pt}$
Given $E^0(\text{Sn}/\text{Sn}^{2+}) = -0.14\text{V}$

- (b) Conductivity of 0.00241M acetic acid is $7.896 \times 10^{-5} \text{Scm}^{-1}$. Calculate its molar conductivity. If $\Lambda^{\circ}m$ for acetic acid is $390.5 \text{cm}^2 \text{mol}^{-1}$, what is the dissociation constant?

OR

- (a) Calculate the emf of the cell in which the following reaction takes place.

$$\text{Ni}_{(s)} + 2\text{Ag}^+_{(0.002M)} \longrightarrow \text{Ni}^{2+}_{(0.160M)} + 2\text{Ag}_{(s)}$$
 Given that $E^{\circ}_{\text{cell}} = 1.05\text{V}$.
- (b) i) Calculate the potential of hydrogen electrode in contact with a solution whose P^{H} is 10.
 ii) How will P^{H} of brine (aq.NaCl solution) be affected when it is electrolyzed?

- 36 (a) How will you convert (5)
 i) Ethanoic acid in to propanoic acid.
 ii) Nitro methane in to Dimethyl ammine.
 iii) Methanol in to methanoic acid.

- (b) Write a short note on the following:
 i) Hoff manns bromamide reaction.
 ii) Coupling reaction.

OR

- (a) Write the structure of A and B in the following:



- (b) Carboxylic acid contain carbonyl group but do not show the nucleophilic reaction like aldehydes or ketones. Why?

- 37 (a) write the preparation of $\text{K}_2\text{Cr}_2\text{O}_7$ from chromate. (5)



OR

- (a) What is meant by disproportionation of an oxidation state? Give an example.
 (b) Describe Lanthanoid contraction.
 (c) What happens when lanthanum is heated with sulphur?
 (d) What is mish metal? write the constituent elements present in mish metal. Give one use of it.
 (e) Write the electronic configuration of Ce^{4+} ($Z=58$)

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