



**INDIAN SCHOOL SOHAR**  
**PRE-BOARD EXAMINATION 2019-2020**

**CHEMISTRY**

**CLASS : XII**  
**DATE : 09.01.2020**

**MAX MARKS : 70**  
**TIME : 3.00 HRS**

- (a) All questions are compulsory.  
 (b) Section A: Q.no. 1 to 20 are 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 long answer questions and carry 5 marks each.  
 (f) There is no overall choice. However an internal choice has been provided in two questions in 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 log tables if necessary, use of calculators is not allowed.

**SECTION A**

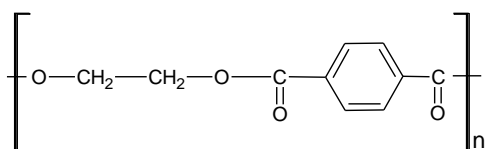
**Read the given passage and answer the questions 1 to 5 that follow:**

Grignard reagents are versatile organometallic compound in which carbon-magnesium has significant ionic character. The hydrocarbon part of Grignard reagent acts as a source of carbocations. Therefore, it readily undergoes nucleophilic addition reactions to aldehydes, ketones, ester, nitriles forming the product which upon hydrolysis gives alcohol and other compounds. Grignard reagent on reaction with H<sub>2</sub>O and alcohol gives hydrocarbon.

- Write reaction involved in the preparation of benzyl alcohol from methanol.
- How 2-methylpropan-2-ol can be prepared from propanone?
- What will be the product formed when benzyl magnesium bromide is treated with ethanol?
- Write product formed on reaction between ethylformate and excess of CH<sub>3</sub>MgBr followed by hydrolysis.
- Write reaction sequence for preparation of propan-1-ol from bromoethane.

**Questions 6 to 10 are one word or one sentence answers:**

- Which reducing agent is employed to get copper from the leached low grade copper ore?
- Which of the two components of starch is water insoluble?
- Write a reaction which shows that all the carbon atoms in glucose are linked in a straight chain.
- Write the names of monomers of the following polymer:



- What is meant by cell constant?

**Questions 11 to 15 are multiple choice questions:**

- Toluene reacts with a halogen in the presence of iron(III)chloride giving ortho and para halo compounds. The reaction is \_\_\_\_\_.  
 (a) Electrophilic elimination reaction                      (c) Electrophilic substitution reaction

- (b) Free radical addition reaction                      (d) Nucleophilic substitution reaction
12. Crystal field stabilization energy for high spin  $d^4$  octahedral complex is  
 (a)  $-1.6\Delta_0 + P$       (b)  $-1.80\Delta_0$       (c)  $-1.2\Delta_0$       (d)  $-0.6\Delta_0$
13. The geometry of  $Ni(CO)_4$  and  $[Ni(PPh_3)_2Cl_2]$  are  
 (a) both square planar                      (c) Tetrahedral and square planar respectively  
 (b) both tetrahedral                      (d) Square planar and tetrahedral respectively
14. When 0.1 mol  $CoCl_3(NH_3)_5$  is treated with excess of  $AgNO_3$ , 0.2 mol of  $AgCl$  are obtained. The conductivity of solution will correspond to  
 (a) 1:3 electrolyte                      (c) 1:1 electrolyte  
 (b) 1:2 electrolyte                      (d) 3:1 electrolyte
15. Which of the following is a thermostatic plastic?  
 (a) PVC                      (b) PVA                      (c) Bakelite                      (d) Perspex

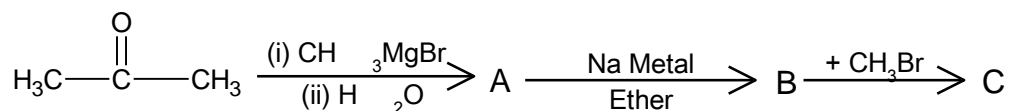
**Question 16 to 20:**

- (a) Assertion and reason both are correct statements; reason is correct explanation for assertion.  
 (b) Assertion and reason both are correct statements; reason is not correct explanation for assertion.  
 (c) Assertion is correct statement but reason is wrong statement.  
 (d) Assertion is wrong statement but reason is correct statement.
16. **Assertion** : Glycine must be taken through diet.  
**Reason** : It is a non-essential amino acid..
17. **Assertion** : A solution of sucrose in water is dextrorotary but on hydrolysis in presence of little hydrochloric acid, it becomes laevorotatory.  
**Reason** : Sucrose on hydrolysis gives unequal amounts of glucose and fructose as a result of which change in sign of rotation is observed.
18. **Assertion** : HI cannot be prepared by the action of conc.  $H_2SO_4$  on KI.  
**Reason** : HI is more volatile than  $H_2SO_4$ .
19. **Assertion** :  $\Lambda_m$  for weak electrolytes shows a sharp increase when the electrolytic solution is diluted.  
**Reason** : For weak electrolytes degree of dissociation increases with dilution of solution.
20. **Assertion** : Nitration of chlorobenzene leads to the formation of m-nitrochlorobenzene.  
**Reason** :  $-NO_2$  group is a m-directing group.

**SECTION B**

21. Draw the structures of the following:  
 (i)  $H_2SO_3$                       (ii)  $HClO_3$
22. Show that in a first order reaction, time required for completion of 99.9% is 10 times that of half-life ( $t_{1/2}$ ) of the reaction.
23. Calculate the freezing point of a solution containing 60g of glucose (Molar mass =  $180\text{g mol}^{-1}$ ) in 250g of water. ( $K_f$  of water =  $1.86 \text{ K Kg mol}^{-1}$ )

24. Complete the following reaction sequence:



25. Give the formula of each of the following coordination entities:

- (i)  $\text{Co}^{3+}$  ion is bound in one  $\text{Cl}^-$ , one  $\text{NH}_3$  molecule and two bidentate ethylene diamine (en) molecules.  
 (ii)  $\text{Ni}^{2+}$  ion is bound to two water molecules and two oxalate ions.

OR

Indicate the types of isomerism exhibited by the following complexes and draw the structures for these isomers:

- (i)  $[\text{Pt}(\text{NH}_3)(\text{H}_2\text{O})\text{Cl}_2]$  (ii)  $[\text{Cr}(\text{H}_2\text{O})_2(\text{C}_2\text{O}_4)_2]$

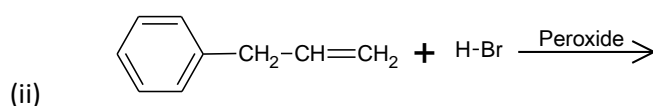
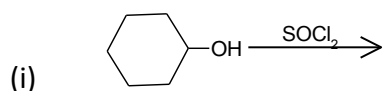
26. Write the role of the following:

- (i) CO in the purification of nickel.  
 (ii) Graphite rod in the electrometallurgy of aluminium.

OR

- (i) Which solution is used for the leaching of silver metal in the presence of air in the metallurgy of silver?  
 (ii) Out of C and CO, which is a better reducing agent at the lower temperature range in the blast furnace to extract iron from the oxide ore?

27. Draw the structure of major monohalo product in each of the following reactions:



### SECTION C

28. Calculate the boiling point of solution when 2g of  $\text{Na}_2\text{SO}_4$  (molar mass =  $142 \text{ gmol}^{-1}$ ) was dissolved in 50g of water, assuming  $\text{Na}_2\text{SO}_4$  undergoes complete ionisation. ( $K_b$  for water =  $0.52 \text{ Kkgmol}^{-1}$ )

29. The rate of reaction,  $2\text{NO} + \text{Cl}_2 \rightarrow 2\text{NOCl}$  is doubled when concentration of  $\text{Cl}_2$  is doubled and it becomes eight times when concentration of both NO and  $\text{Cl}_2$  are doubled. Deduce the order of the reaction.

OR

A certain reaction is 50% complete in 20 minutes at 300K and the same reaction is again 50% complete in 5 minutes at 350K. Calculate the activation energy if it is a first order reaction.

30. Define the following:

- (i) Electrophoresis (ii) Micelles (iii) Peptization

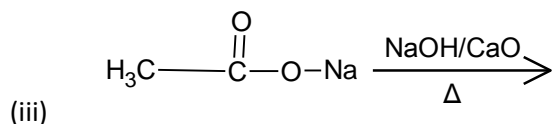
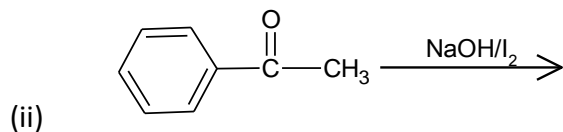
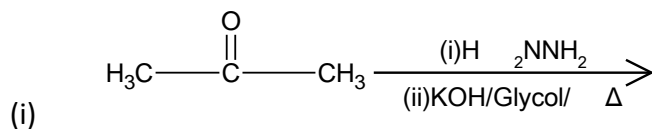
31. Complete the following chemical equations:

- (i)  $\text{Fe}^{3+} + \text{SO}_2 + \text{H}_2\text{O} \rightarrow$  (ii)  $\text{S} + \text{H}_2\text{SO}_4 \rightarrow$

32. (i) A current of 1.50 A was passed through an electrolytic cell containing  $\text{AgNO}_3$  solution with inert electrodes. The weight of Ag deposited was 1.50g. How long did the current flow?

- (ii) Write the reactions taking place at the anode and cathode in the above cell.  
 (iii) Give reactions taking place at the two electrodes if these are made up of Ag.

33. Predict the products of the following reactions:



OR

How would you bring about the following conversions? Write the complete equation in each case.

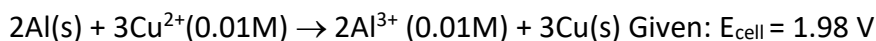
- (i) Ethanal to 3-hydroxybutanal  
 (ii) Benzoic acid to m-nitrobenzyl alcohol  
 (iii) Benzaldehyde to benzophenone

34. Explain the following terms giving one example of each type:

- (i) Antiseptics                      (ii) Antibiotics                      (iii) Anionic detergents

#### SECTION D

35. (i) Calculate  $E^\circ_{\text{cell}}$  following reaction at 298 K:



(ii) Using the  $E^\circ$  values of A and B, predict which is better for coating the surface of iron. [ $E^\circ_{\text{Fe}^{2+}/\text{Fe}} = -0.44\text{V}$ ] to prevent corrosion and why? Given:  $E^\circ_{\text{A}^{2+}/\text{A}} = -2.37\text{V}$ ;  $E^\circ_{\text{B}^{2+}/\text{B}} = -0.14\text{V}$

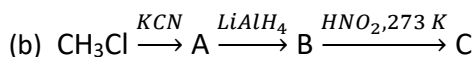
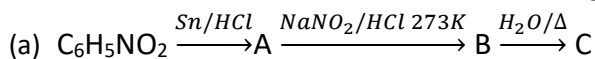
OR

At 291K, the molar conductivities at infinite dilution of  $\text{NH}_4\text{Cl}$ ,  $\text{NH}_4\text{OH}$  and  $\text{NaCl}$  are 129.8, 217.4 and 108.9  $\text{Scm}^2\text{mol}^{-1}$  respectively. If the molar conductivity of a centinormal solution of  $\text{NH}_4\text{OH}$  is 9.33  $\text{Scm}^2\text{mol}^{-1}$ , what is the percentage of dissociation of  $\text{NH}_4\text{OH}$  at this dilution? Also calculate the dissociation constant of  $\text{NH}_4\text{OH}$

36. (i) Write the structures of main products when benzene diazonium chloride ( $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^-$ ) reacts with the following reagents:

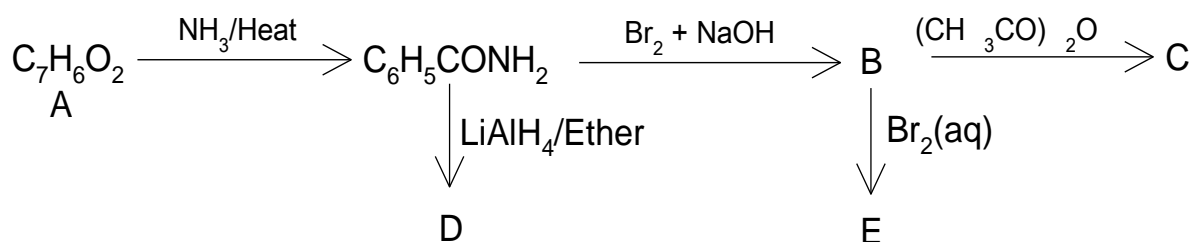
- (a)  $\text{HBF}_4/\Delta$                       (b)  $\text{Cu/HBr}$

(ii) Write the structures of A, B and C in the following reactions:



OR

An aromatic compound 'A' of molecular formula  $\text{C}_7\text{H}_6\text{O}_2$  undergoes a series of reactions as shown below. Write the structures of A, B, C, D and E in the following reactions:



37. (a) Assign suitable reason for the following:
- (i) The  $\text{Mn}^{2+}$  compounds are more stable than  $\text{Fe}^{2+}$  towards oxidation to their +3 state.
  - (ii)  $\text{Sc}^{3+}$  is colourless in aqueous solution whereas  $\text{Ti}^{2+}$  is coloured.
  - (iii) The highest oxidation state is exhibited in oxo-anions of a metal.
- (b) Complete and balance the following equation:
- (i)  $\text{MnO}_4^- + \text{I}^- + \text{H}^+ \rightarrow$
  - (ii)  $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{KCl} \rightarrow$
- OR
- (a) Complete and balance the following chemical equations:
- (i)  $\text{Cr}_2\text{O}_7^{2-} + \text{Sn}^{2+} + \text{H}^+ \rightarrow$
  - (ii)  $\text{MnO}_4^- + \text{S}_2\text{O}_3^{2-} + \text{H}_2\text{O} \rightarrow$
- (b) Account for the following:
- (i)  $\text{Mn}_2\text{O}_7$  is acidic whereas  $\text{MnO}$  is basic.
  - (ii) Though copper has completely filled d-orbital ( $d^{10}$ ) yet it is considered as a transition metal.
  - (iii) Actinoids show wide range of oxidation states.