



INDIAN SCHOOL SOHAR
TERM II EXAMINATION (2018 – 19)
CHEMISTRY

CLASS : XII
DATE : 15.11.2018

MAX. MARKS : 70
DURATION : 3.00 HRS

General Instructions:

- (a) All questions are compulsory.
- (b) Section A: Question numbers 1 to 5 very short answer questions carrying 1 mark each.
- (c) Section B: Question numbers 6 to 12 are short answer questions carrying 2 marks each.
- (d) Section C: Question numbers 13 to 24 are also short answer questions carrying 3 marks each.
- (e) Section D: Question numbers 25 and 27 are long answer questions carrying 5 marks each.
- (f) There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four 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 calculator is not allowed.

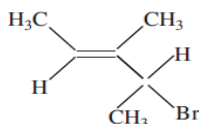
Section - A

1. ZnO crystal on heating acquires the formula $Zn_{1+x}O$. Give reason.

OR

What is the two dimensional coordination number of a molecule in a square close-packed layer?

2. Define the term 'Order of reaction' for chemical reactions.
 3. Give the IUPAC name of the following compound:



OR

Draw the structure of the following compound: 1-Bromo-4 -sec-butyl-2-methylbenzene

4. Arrange the following compounds in the increasing order of their acid strengths:
 4-Nitrophenol, Phenol, 2,4,6-Trinitrophenol
 5. What is tincture of iodine?

Section - B

6. Explain how you can determine the atomic mass of an unknown metal if you know its mass density and the dimensions of unit cell of its crystal.

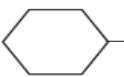
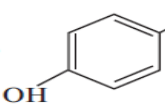
OR

Define the following terms in relation to crystalline solids:

- (i) Unit cell (ii) Coordination number. Give one example in each case.
 7. State Raoult's law for solutions of volatile liquids. Taking suitable examples explain the meaning of positive and negative deviations from Raoult's law.

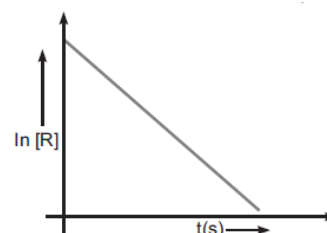
OR

Define the term osmotic pressure. Describe how the molecular mass of a substance can be determined by a method based on measurement of osmotic pressure.

8. 18 g of glucose, $C_6H_{12}O_6$ (Molar Mass = 180 gmol^{-1}) is dissolved in 1kg of water in a sauce pan. At what temperature will this solution boil? (K_b for water = 0.52 Kkgmol^{-1} , boiling point of pure water = 373.15 K)
9. A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5.0 ampere for 20 minutes. What mass of nickel will be deposited at the cathode? (Given atomic mass of Ni = 58.7 gmol^{-1} ; $1F = 96500 \text{ Cmol}^{-1}$)
10. Complete the following reactions:
- (i) $I_2 + \text{Conc. HNO}_3 \rightarrow$
- (ii) $HgCl_2 + PH_3 \rightarrow$
11. Complete the following reaction equations:
- (i)  $+ SOCl_2 \longrightarrow$
- (ii)  $+ HCl \longrightarrow$
12. Illustrate the following name reactions giving suitable example in each case:
- (a) Clemmenson Reduction
- (b) Hell-Volhard-Zelinsky Reaction

Section -C

13. Aluminium crystallises in a cubic close-packed structure. Radius of the atom in the metal is 125 pm.
- 1) What is the length of the side of the unit cell?
 - 2) How many unit cells are there in 1 cm^3 of aluminium?
14. Answer the following:
- (i) Measurement of which colligative property is preferred for determination of molar mass of biomolecules?
 - (ii) Why is an increase in temperature observed on mixing chloroform and acetone?
 - (iii) Why does sodium chloride solution freeze at a lower temperature than water?
15. For a chemical reaction $R \rightarrow P$, the variation in the concentration $\ln[R]$ vs time t plot is given as
- For this reaction
- (i) What is the order of the reaction?
 - (ii) What is the slope of the curve?
 - (iii) What is the unit of rate constant 'k'?



16. A certain reaction is 50% complete in 20 minutes at 300 K and the same reaction is again 50% complete in 5 minutes at 350 K. Calculate the activation energy if it is a first order reaction. [$R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$; $\log 4 = 0.62$]
17. Explain the following observations:
- (i) Fluorine does not exhibit any positive oxidation state.
 - (ii) The majority of known noble gas compounds are those of xenon.
 - (iii) Phosphorus is much more reactive than nitrogen.

OR

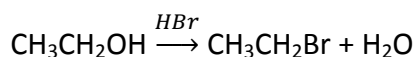
Write chemical equations for the following observations:

- Chlorine reacts with a hot concentrated solution of sodium hydroxide.
- Othrophosphorus acid is heated.
- PtF₆ and xenon are mixed together.

18. Answer the following:

- Identify chiral in CH₃CH(OH)CH₂CH₃ and CH₃CH(OH)CH₃.
- Among the following compounds, which one is more easily hydrolysed and why?
CH₃CH(Cl)CH₂CH₃ or CH₃CH₂CH₂CH₂Cl
- Which of the these will react faster in S_N2 displacement and why?
1-bromopentane or 2-bromopentane

19. Write the mechanism of the following reaction:



Write the equations involved in Reimer-Tiemann reaction.

20. How would you convert the following?

- Phenol to benzoquinone
- Propanone to 2-methylpropan-2-ol
- Propene to propan-2-ol

OR

Explain the following observations

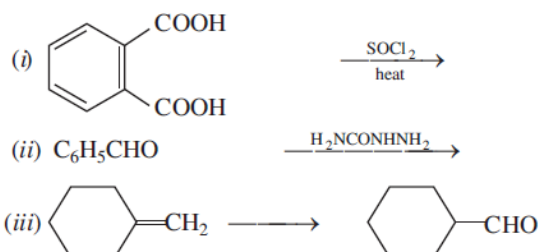
- The boiling point of ethanol is higher than that of methoxymethane.
- Phenol is more acidic than ethanol.
- o- and p- nitrophenols are more acidic than phenol.

21. An alkene 'A' molecular formula (C₅H₁₀) on ozonolysis gives a mixture of two compound 'B' and 'C'. Compound 'B' gives positive Fehling's test and also reacts with iodine and NaOH solution. Compound 'C' does not give Fehling's test but forms iodoforms. Identify the compounds 'A', 'B' and 'C' giving suitable explanation and write the reactions of ozonolysis and iodoform formation from either 'B' or 'C'.

- Cyclohexanone forms cyanohydrin in good yield but 2,2,6-trimethylcyclohexanone does not.
- Hydrazone of aldehydes and ketones are not prepared in highly acidic medium.
- During the preparation of esters from a carboxylic acid and an alcohol in the presence of an acid catalyst, the water or the ester formed should be removed as soon as it is formed.

OR

Complete each synthesis by giving missing reagents or products in the following:



23. Give one chemical test each to distinguish between the compounds in the following pairs:

- Methylamine and dimethylamine
- Aniline and benzylamine
- Ethylamine and aniline

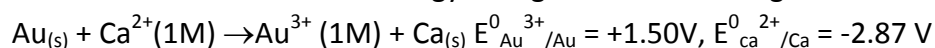
24. What are the following substances? Give one example of each one of them.
- Tranquillisers
 - Food preservatives
 - Synthetic detergents

Section -D

25. Predict the products of electrolysis of the following:
- An aqueous solution of AgNO_3 with silver electrodes.
 - An aqueous solution of AgNO_3 with platinum electrodes.
 - An dilute solution of H_2SO_4 with platinum electrodes.
 - An aqueous solution of CuCl_2 with platinum electrodes.

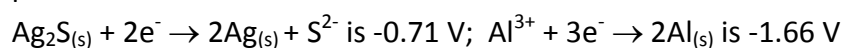
OR

- (a) Calculate the standard free energy change for the following reaction at 25°C .

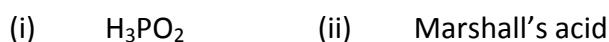


Predict whether the reaction will be spontaneous or not at 25°C . Which of the above two half cells will act as an oxidising agent and which one will be a reducing agent?

- (b) Tarnished silver contains Ag_2S . Can this tarnish be removed by placing tarnished silver ware in an aluminium pan containing an inert electrolytic solution such as NaCl . The standard electrode potential for half reaction:



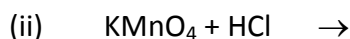
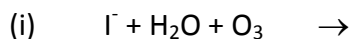
26. (a) Draw the structures of the following molecules:



- (b) How would you account for the following:

(i) The stability of +5 oxidation state decreases down the group 15 of the periodic table.

- (c) Complete the following reactions:



OR

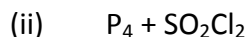
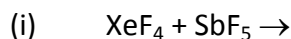
- (a) Draw the structure of the following molecules:



- (b) Explain the following:

(i) SF_6 is known but SCl_6 is not known.

- (c) Complete the following reactions:



27. A hydrocarbon 'A', (C_4H_8) on reaction with HCl gives a compound 'B', ($\text{C}_4\text{H}_9\text{Cl}$), which on reaction with 1 mol of NH_3 gives compound 'C', ($\text{C}_4\text{H}_{11}\text{N}$). On reacting with NaNO_2 and HCl followed by treatment with water, compound 'C' yields an optically active alcohol, 'D'. Ozonolysis of 'A' give 2 moles of acetaldehyde. Identify the compounds 'A' to 'D'. Explain the reactions involved.

OR

A mixture of two aromatic compounds (A) and (B) was separated by dissolving in chloroform followed by extraction with aqueous KOH solution. The organic layer containing compound (A) when heated with alcoholic solution of KOH , produced compound C ($\text{C}_7\text{H}_5\text{N}$), which is an associated molecule and has an

unpleasant odour. The alkaline aqueous layer on the other hand with chloroform and then acidified gives a mixture of two isomeric compounds (D) and (E) of molecular formula, $C_7H_6O_2$. Identify the compounds (A), (B), (C), (D) and (E). Write the structures of them.
