



INDIAN SCHOOL MUSCAT

Class : XII

HALF YEARLY EXAMINATION- 2017

12/09/ 2017

CHEMISTRY (043)

Maximum Marks: 40

Time Allowed: 3 hrs

General instructions:

- All questions are compulsory
- Mark for each question is indicated against it.
- Question numbers 1 to 5 are very short answer questions and carry one mark each.
- Question numbers 6 to 10 are short answer questions and carry two marks each.
- Question numbers 11 to 22 are short answer questions and carry three marks each.
- Question number 23 is a value based question and carry four marks.
- Question numbers 24 to 26 are long answer questions and carry five marks each.

1. Name the non-stoichiometric point defect responsible for colour in alkali metal halides. 1
2. Write the structure of the compound 1,4-dibromobut-2-ene 1
3. Based on molecular forces, what type of polymer is natural rubber? 1
4. Give a method for the preparation of Methanol. 1
5. SO_2 acts as both oxidizing and reducing agent. why? 1
6. a. What do you mean by the term 'forbidden zone' in reference to band theory of solids? 2
b. What is the maximum possible coordination number of an atom in, hcp crystal structure of an element?
7. State Henry's law and mention its two important applications. 2

OR

Account for the following –

- a. The vapour pressure of a solution of glucose in water is lower than that of pure water.
- b. RBC swell up and finally burst when placed in 0.1% NaCl solution 2
8. Define 2
a. Mole fraction
b. Van't Hoff factor
9. a. Why does NO_2 dimerise?
b. Why do noble gases have very low boiling points? 2

- 2
10. Explain the following :
 - a. Wurtz reaction
 - b. Ambident nucleophiles
 11. An element has a bcc structure with a cell edge of 288 pm. The density of the metal is 7.2 g cm^{-3} . How many atoms and unit cells are there in 100 g of the element? 3
 12. Define the following 3
 - a. Crystal lattice
 - b. Packing efficiency
 - c. Schottky defect
 13. Write the names and structures of the monomers of the following polymers: 3
 - a. Nylon- 66
 - b. Novolac
 - c. Buna -N
 14. a. Glass objects from ancient civilizations are found to become milky in appearance. Why? 3
 - b. Distinguish between face-centered and end centered unit cells.
 15. A solution prepared from 1.25 g of methyl salicylate in 90 g of benzene has a boiling point of 80.31°C . Determine the molar mass of this compound ? 3
(Boiling point of pure benzene = 80.10°C and K_b for benzene is $2.53 \text{ K KgMol}^{-1}$.)
 16. Arrange the following in the order of property indicated for each set : 3
 - a. $\text{PH}_3, \text{NH}_3, \text{AsH}_3, \text{SbH}_3, \text{BiH}_3$ (Decreasing basic strength)
 - b. $\text{HF}, \text{HCl}, \text{HBr}, \text{HI}$ (Increasing acid strength)
 - c. $\text{H}_2\text{O}, \text{H}_2\text{S}, \text{H}_2\text{Se}, \text{H}_2\text{Te}$ (Increasing bond angle)
 17. Account for the following 3
 - a. Nitrogen does not form a pentahalide .
 - b. Of the noble gases only xenon forms known chemical compounds.
 - c. HF is less volatile than HCl.
 18. How would you differentiate between $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$ mechanisms of substitution reactions? 3
Give one example of each.
 19. a. Write a chemical test to distinguish between chlorobenzene and benzyl chloride. 3
 - b. Give reason for the following :
 - (i) Sulphuric acid not used during the reaction of alcohols with KI.
 - (ii) Thionyl chloride is the preferred reagent for converting ethanol to chloroethane.
 20. a. Give the IUPAC name of $(\text{CH}_3)_2\text{CHCH}_2\text{CH}(\text{OH})\text{CH}(\text{CH}_3)\text{CH}_2\text{OH}$ 3
 - b. Explain the following reactions
 - (i) Kolbe's reaction
 - (ii) Synthesis of phenol from cumene

21. The following is not an appropriate reaction for the preparation of tert.-butyl ethyl ether: 3



- (i) What would be the major product of the given reaction?
- (ii) Write a suitable reaction for the preparation of tert.-butyl ethyl ether, specifying the names of reagents used.
- (iii) Justify your answer in both cases.

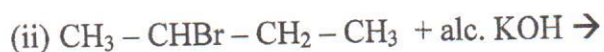
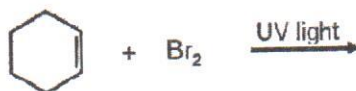
OR

- a. Write the mechanism of acid catalyzed dehydration of an alcohol forming an alkene.
- b. Which is more acidic, p-nitrophenol or phenol? Explain why?

22. a. State Zaitsev rule. 3

b. Complete the following equations:

(i)



23. Recently a blanket ban is imposed on use of any kind of polythene bags in Delhi. Polythene is supposed to be non-biodegradable and creates acute environmental problems, but some polythene manufacturing units opposed this decision. 4

- a. Name one important catalyst used in the manufacturing of polythene.
- b. Write the chemical reaction involved the manufacture of polythene.
- c. Give one example of biodegradable polymer.
- d. Which value is missing in the polythene manufacturing traders?

24. a. Define Ebullioscopic constant. 5

- b. What is the advantage of using osmotic pressure as compared to other colligative properties for the determination of molar masses of solutes in solutions?
- c. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K₂SO₄ in 2 liter of water at 25° C, assuming that it is completely dissociated.

OR

- a. What is meant by positive and negative deviations from Raoult's law and how is the sign of $\Delta_{\text{sol}}H$ related to positive and negative deviations from Raoult's law?
- b. The vapour pressure of water is 12.3 KPa at 300K. Calculate the vapour pressure of one molal solution of a non volatile, non-ionic solute in water?

25. a. Complete the following chemical equations





b. Assign a reason for each of following :

- (i) Bi(V) is a stronger oxidising agent than Sb(V).
- (ii) Fluorine does not exhibit any positive oxidation state.
- (iii) Iron dissolves in HCl to form FeCl_2 and not FeCl_3 .

OR

- a. Explain the manufacture of sulphuric acid by contact process.
- b. PCl_5 fumes in moist air .why?
- c. Draw the structural formula of the following molecules

- (i) HClO_4
- (ii) BrF_3

26.

a. How would you convert

- (i) Phenol to picric acid
- (ii) Ethyl magnesium chloride to propan-1-ol

b. Account for the following

- (i) Ortho-nitrophenol is steam volatile while para-nitrophenol is not.
- (ii) Phenol is more acidic than alcohol.
- (iii) The boiling points of alcohols decrease with increase in branching of alkyl chain.

OR

a. What happens when :

- (i) Sodium reacts with Ethyl alcohol.
- (ii) phenol is treated with chloroform in presence of dilute NaOH .
- (iii) Butan-1-ol reacts with HCl-ZnCl_2

b. Give equations of the following reactions

- (i) Friedelcraft's acylation of anisole.
- (ii) Oxidation of 2-methyl propan-2-ol with Cu catalyst at 573 K

End of the Question Paper