



Indian School Al Wadi Al Kabir
Assessment 1
Chemistry (Code: 043) – SET 1

Class : XII
Date : 27/09/2022

Time: 3 Hours
Max. Marks : 70

General Instructions:

- i. All questions are compulsory.
- ii. Section A- Q.1 to Q.10 are multiple choice type and carry 1 mark each.
- iii. Section B- Q. 11 to Q. 15 are Assertion Reason type and carry 1 mark each.
- iv. Section C- Q. 16 to Q. 20 are passage-based questions and carry 1 mark each.
- v. Section D- Q. 21 to Q.27 are short answer type and carry 2 marks each.
- vi. Section E- Q. 28 to Q.34 are short answer type and carry 3 marks each
- vii. Section F- Q. 35 to Q. 37 are long answer type and carry 5 marks each.
- viii. There is no overall choice. However, internal choices have been provided in few questions.
A student has to attempt only one of the alternatives in such questions.
- ix. Use of calculators and log table is not permitted.

SECTION A

1. Which among the following is a geminal dihalide? (1)
(a) $\text{CH}_3\text{CH}_2\text{Br}$
(b) CH_3CHBr_2
(c) $\text{CH}_2\text{BrCH}_2\text{Br}$
(d) $\text{CH}_3\text{CHBrCH}_2\text{Br}$
2. The reaction of CH_3MgBr with CH_3CHO followed by hydrolysis forms _____ (1)
(a) $\text{CH}_3\text{CH}_2\text{OCH}_3$
(b) $\text{CH}_3\text{CH}_2\text{OH}$
(c) $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
(d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr}$
3. Sucrose is a _____ compound but the product of its hydrolysis is _____ in nature. (1)
(a) dextrorotatory; dextrorotatory
(b) laevorotatory; laevorotatory
(c) laevorotatory; dextrorotatory
(d) dextrorotatory; laevorotatory
4. A plant cell shrinks when it is kept in a _____ (1)
(a) hypotonic solution
(b) hypertonic solution
(c) isotonic solution
(d) pure water

5. The electronic configuration of outer orbitals of d block elements is _____ (1)
(a) $(n-1) d^{1-10} ns^{1-2}$
(b) $(n-1) d^{0-10} ns^{1-2}$
(c) $(n-2) d^{1-10} ns^{1-2}$
(d) $(n-1) d^{1-10} ns^2$
6. The reaction of Chloroalkane with NaI in the presence of dry acetone is known as _____ (1)
(a) Wurtz reaction
(b) Fittig reaction
(c) Finkelstein reaction
(d) Swarts reaction
7. Which among the following on oxidation gives a ketone? (1)
(a) Primary alcohol
(b) Secondary alcohol
(c) Tertiary alcohol
(d) All of these
8. RNA is different from DNA because RNA contains (1)
(a) ribose sugar and thymine
(b) ribose sugar and uracil
(c) deoxyribose sugar and thymine
(d) deoxyribose sugar and uracil
9. Sprinkling of salt helps in clearing the snow-covered roads in hills. The phenomenon involved in this process is _____ (1)
(a) lowering in vapour pressure of snow
(b) depression in freezing point of snow
(c) melting of ice due to increase in temperature by adding salt
(d) increase in freezing point of snow
10. The term anomers of glucose refer to (1)
(a) isomers of glucose that differ in configurations at carbons one and four (C-1 and C-4)
(b) a mixture of (D)-glucose and (L)-glucose
(c) enantiomers of glucose
(d) isomers of glucose that differ in configuration at carbon one. (C-1)

SECTION B

For question numbers 11 to 15, two statements are given-one labelled Assertion(A) and the other Reason (R). Select the correct answer to these questions from the given codes. (1×5=5)

- (a) Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of Assertion(A)
- (b) Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of Assertion(A)
- (c) Assertion (A) is correct but Reason (R) is incorrect statement.
- (d) Assertion (A) is incorrect but Reason (R) is correct statement.

11. Assertion (A): Proteins are found to have two different types of secondary structures viz alpha-helix and beta-pleated sheet structure.
Reason (R): The secondary structure of proteins is stabilized by hydrogen bonding.
12. Assertion (A): o-Nitrophenol is steam volatile
Reason (B): o-Nitrophenol is prepared from Phenol using con. HNO_3
13. Assertion (A): $\text{S}_{\text{N}}1$ reactions of optically active halides are accompanied by racemisation.
Reason (B): The carbocation formed in the slow step being sp^2 hybridised is planar.
14. Assertion (A): The relative lowering of vapour pressure of 0.1M sugar solution is less than that of 0.1 M KCl solution.
Reason (R): Lowering of vapour pressure is directly proportional to the number of solute particles present in the solution.
15. Assertion (R): Scandium ($Z = 21$) and Zinc ($Z = 30$) are both considered transition elements.
Reason (R): Scandium and Zinc belong to 3d series.

SECTION C

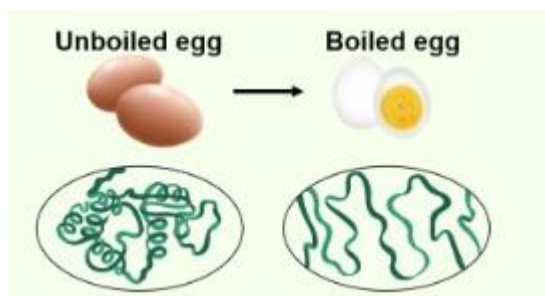
Read the passage carefully and answer the questions 16 to 20 that follow.

(1×5=5)

Proteins are high molecular mass complex compounds of amino acids. The important proteins required for our body are enzymes, hormones, antibodies, transport proteins, structural proteins etc. Except for Glycine, all α amino acids have chiral carbon atom and most of them have L configuration. The amino acids exist as dipolar ion called Zwitter ion, in which a proton goes from the carboxyl group to the amino group.

A large number of α amino acids are joined by peptide bonds forming polypeptides. The peptides having very large molecular mass (more than 10000 u) are called proteins. The structure of proteins is described as primary structure giving sequence of linking of amino acids, secondary structure giving manner in which polypeptide chains are arranged and folded, tertiary structure giving folding, coiling or bonding polypeptide chains producing three dimensional structures and quaternary structure giving arrangement of subunits in an aggregate protein molecule.

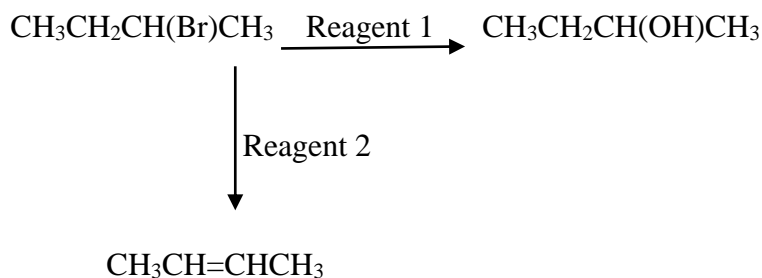
16. Name an optically active amino acid.
17. Name the forces that stabilise secondary and tertiary structure of proteins.
18. What are fibrous proteins? Give an example.
19. Observe the figure carefully and explain the process.



20. Define the term essential amino acid with an example.

SECTION D

21. Name the reagents in the following reactions. (2)



22. Explain the following with suitable reactions. (2)

- (a) Preparation of Aspirin
(b) Reimer Tiemann reaction

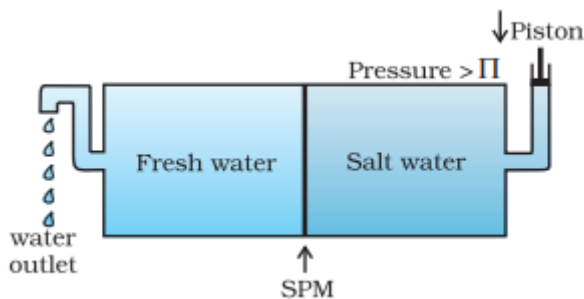
23. Account for the following statements. (2)

- (a) The bond angle in ethers is slightly greater than the tetrahedral angle.
(b) Phenols are less soluble in water.

24. What happens when D-Glucose is treated with (2)

- (a) Con HNO_3
(b) Br_2 water

25. (a) Define the process depicted in the figure given below. (2)



(b) Write one practical application of the above process.

26. Write the electronic configuration of the following. (2)

- (a) Chromium
(b) Titanium

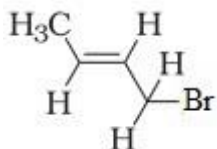
27. Name two fat soluble vitamins and the diseases caused due to their deficiency in diet. (2)

OR

List two reactions of glucose that cannot be explained by its open structure.

SECTION E

28. (a) Write the IUPAC name of the following compound. (3)

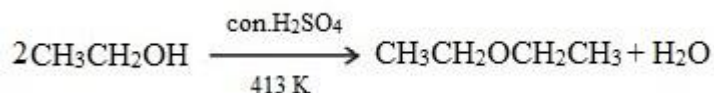


(b) Give reasons for the following.

- Haloarenes are extremely less reactive towards nucleophilic substitution.
- Chloroform is stored in closed dark coloured bottles.

29. Calculate the mass of ascorbic acid ($C_6H_8O_6$) to be dissolved in 75 g of acetic acid to lower its melting point by $1.5^\circ C$. $K_f = 3.9 K kg mol^{-1}$. (3)

30. Write the mechanism for the following reaction (3)

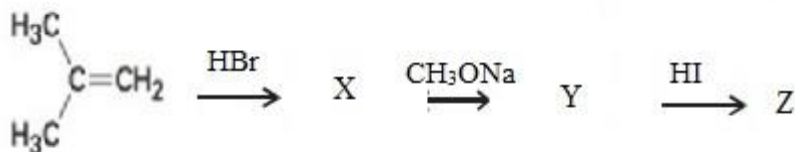


31. Arrange the following in the increasing order of the property mentioned in the parenthesis. (3)

- Pentan-1-ol, n-butane, ethoxyethane (Boiling point)
- Propan-1-ol, 2,4,6-Trinitrophenol, 4-Methylphenol, Phenol (acidic strength)
- Ethanol, 2-Methylpropan-2-ol and Propan-2-ol (ease of dehydration)

OR

Consider the following reaction and identify the products X, Y and Z.

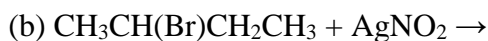
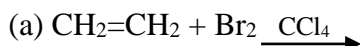


32. (a) Vitamin C should be supplied regularly in our diet. Explain. (3)

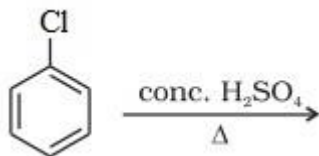
(b) What are the products of hydrolysis of Lactose?

(c) The bond that exists between any two nucleotides is _____

33. Complete the reactions. (3)



(c)



34. (a) State Raoult's law in its general form in reference to solutions. (3)

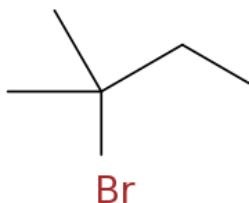
(b) Differentiate between ideal and non-ideal solutions.

SECTION F

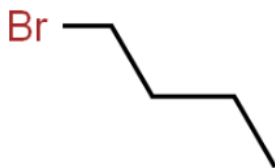
35. Choose the right answer with an explanation to your choice. (5)

(a) Compound which is more reactive towards S_N2 mechanism

i.



ii.



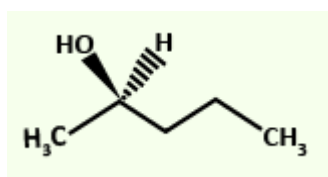
(b) Compound which has higher boiling points

i. CH_4

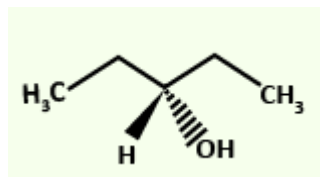
ii. CH_3Cl

(c) The compound that is optically active among the following is _____

i.

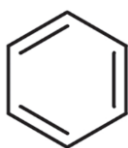


ii.

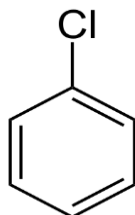


(d) Compound which is more reactive towards electrophilic substitution,

i.



ii.



(e) Compound which has more density

i. CH_2Cl_2

ii. $CHCl_3$

OR

(a) Among the isomeric alkanes of molecular formula C_5H_{12} , identify the one that on photochemical chlorination yields a single monochloride.

(b) Give a suitable chemical test to distinguish between Propan-2-ol and 2-Methylpropan-2-ol.

(c) What is the nature of bond in Grignard reagent, $RMgX$?

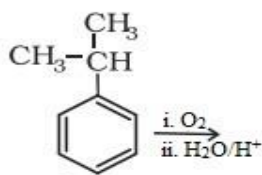
(d) How will you bring out the following conversions?

i. 1-Chlorobutane to n-Octane

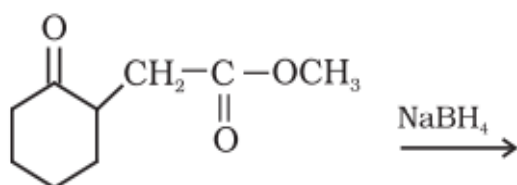
ii. Toluene to benzyl alcohol

36. Predict the products. (5)

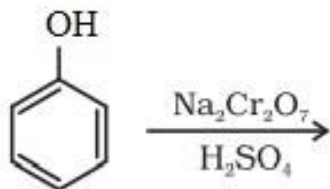
(a)



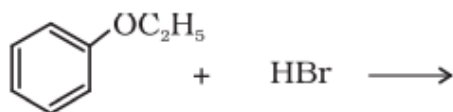
(b)



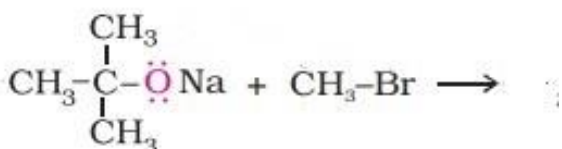
(c)



(d)



(e)



OR

(a) Write short notes on the following.

- Denaturation of alcohols
- Commercial preparation of methanol

(b) Give equations of the following reactions:

- Oxidation of propan-1-ol with alkaline KMnO_4 solution.
- Bromine in CS_2 with phenol.

(c) Write the structure of the following compound.

2-Ethoxy-3-methylpentane

37. (a) Define the terms

- Molality
- Cryoscopic constant
- Edema

(5)

(b) Determine the osmotic pressure of a solution prepared by dissolving 40 mg of NaOH in 2 litres of water at 25°C , assuming that it is completely dissociated. ($R = 0.083 \text{ barLK}^{-1} \text{ mol}^{-1}$)

OR

(a) What type of deviation is shown by a mixture of phenol and aniline? Explain.

(b) A solution of glucose in water is labelled as 10% w/w, what would be the mole fraction of each component in the solution? If the density of solution is 1.2 gml^{-1} , then what shall be the molarity of the solution?