No. of printed pages=5

CLASS-XII

PRE MID TERM EXAMINATION 2025-26

SUBJECT-CHEMISTRY

SET A2

Time:-2 hours **MM=50**

General Instructions:

a) There are **24** questions in this question paper with internal choice.

b) SECTION A consists of 12 multiple-choice questions carrying 1 mark each.

c) SECTION B consists of 4 very short answer questions carrying 2 marks each.

d) SECTION C consists of 4 short answer questions carrying 3 marks each.

e) SECTION D consists of 2 case- based questions carrying 4 marks each.

f) SECTION E consists of 2 long answer questions carrying 5 marks each.

g) All questions are compulsory.

h) Use of log tables and calculators is not allowed.

SECTION A

1. Which of the following reagents can't be used to oxidize primary alcohols to aldehydes?

a) CrO_3 in anhydrous medium

b) $KMnO_4$ in acidic medium

c) Pyridinium chlorochromate

d) Heat in the presence of Cu at 573 K

2.Which of the following is a vinylic halide?

a) $CH_2=CHCHCl_2$

b) $CH_3CHClCH_3$

c) $(CH_3)_2C=CHCH_2Cl$

d) $CH_3CH=CClCH_2CH_3$

3. What is the molarity of a 15 ml, 2 M aqueous solution when 285 ml of water is added to it?

a) 0.400 M

b) 0.100 M

c) 0.111 M

d) 0.105 M

4. Acetic acid associates as dimers in benzene. What is the Van't Hoff factor (i) if the degree of association of acetic acid is 50%?

a) 0.25

b) 0.50

c) 0.75

d) 0.40

5.Which of the following has a chiral carbon atom?
a) 2-Chloro-2-methylpentane
b) 1,1-Dibromoethane
c) Pentan-3-ol
d) 2-Bromopentane

6.How many monohaloalkane isomers can be formed on the free radical bromination of $(CH_3)_2CHCH_2CH_3$?
a) 2
b) 3
c) 4
d) 5

7.Which of the following compounds gives a ketone when its vapours are passes over heated copper at 573K?
a) Propan-1-ol
b) Propan-2-ol
c) 2-Methylpropan-1-ol
d) 2-Methylpropan-2-ol

8. Phosgene is a common name for
a) phosphoryl chloride
b) thionyl chloride
c) carbon dioxide and phosphine
d) carbonyl chloride

9. K_H value for Ar(g), CO_2 (g), HCHO (g) and CH_4 (g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility.

(a) HCHO < CH_4 < CO_2 < Ar

(b) HCHO < CO_2 < CH_4 < Ar

(c) Ar < CO_2 < CH_4 < HCHO

(d) Ar < CH_4 < CO_2 < HCHO

In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices:
(a) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true and the Reason is not the correct explanation of Assertion.
(c) Assertion is not true but the Reason is true.
(d) Assertion is true and Reason is false.

(e) Assertion and Reason both are incorrect statements.

10.Assertion: Methoxy ethane reacts with HI to give ethanol and iodomethane.
Reason: Reaction of ether with HI follows S_N1 mechanism.

11. **Assertion**: When methyl alcohol is added to water, boiling point of water increases.
Reason: When a volatile solute is added to a volatile solvent elevation in boiling point is observed.

12. Assertion: If one component of a solution obeys Raoult's law over a certain range of composition, the other component will not obey Henry's law in that range.
Reason: Raoult's law is a special case of Henry's law.

SECTION B

13. An organic compound 'A' reacts with $SOCl_2$ to give 'B'. B reacts with Mg to form Grignard reagent which is treated with acetone and the product is hydrolysed to give 2-methylbutan-2-ol. Identify A and B and give the reactions. **(2)**

14. (a) Why does p-dichlorobenzene have a higher m.p. than its o- and m-isomers? **(1+1)**
(b) Why is (±)-Butan-2-ol optically inactive?

15. Account for the following: **(1+1)**

(i) The C – Cl bond length in chlorobenzene is shorter than that in CH_3 – Cl.

(ii) Chloroform is stored in closed dark brown bottles.

OR

Various isomeric haloalkanes with the general formula C_4H_9Cl undergo hydrolysis reaction. Among them, compound "A" is the most reactive through S_N1 mechanism. Identify "A" citing the reason for your choice**.** **(2)**

16.(a) Measurement of osmotic pressure method is preferred for the determination of molar masses of macromolecules such as proteins and polymers. Give reason. **(1+1)**

(b) What type of deviation from Raoult's Law is expected when phenol and aniline are mixed with each other? What change in the net volume of the mixture is expected?

SECTION C

17.(a) Write the structure of major alkene formed by β-elimination of 2, 2, 3-trimethyl-3-bromopentane with sodium ethoxide in ethanol. **(1+2)**

(b) Identify (X) and (Y) in the following:

(i) $C_6H_5Br + Mg$ (dry ether) $\longrightarrow$ X

(ii) $C_6H_5Br + Na$(dry ether) $\longrightarrow$ Y

18. Calculate the boiling point of solution when 4 g of $MgSO_4$ (M =120 g mol^{-1}) was dissolved in 100 g of water, assuming $MgSO_4$ undergoes complete ionization.
(K_b for water = 0.52 K kg mol^{-1}) **(3)**

19. When19.5 g of F—CH_2—COOH (Molar mass=78g/mol) is dissolved in 500g of water, the depression in freezing point is observed to be 1°C.Calculate the degree of dissociation of FCH_2—COOH. (Given: K_f of water =1.86 K kg /mol) **(3**

20.Give reasons for the following:- **(1x3)**

(a) In Kolbe's reaction, instead of phenol, phenoxide ion is treated with carbon dioxide.

(b) Ethers can be prepared by Williamson synthesis in which an alkyl halide is reacted with sodium alkoxide. Di-tert-butyl ether can't be prepared by this method.

(c) Alcohols and ethers of comparable molecular mass have different boiling points.

SECTION D

21.Read the given passage and answer the questions that follow: (1+1+2)

Solution play a very important role in our daily life. Alloys, homogeneous mixture of metal are solution of solid in solid. 1 ppm (parts per million) of fluoride ions prevent tooth decay. All intravenous injections must be isotonic with our body fluids, i.e. should have same concentration as blood plasma. Diabetic patients are more likely to have heart attack and high blood pressure due to higher glucose level in blood. Common salt increase blood pressure because Na+ mixes up with blood. Aquatic species are more comfortable in cold water than warm water.

1. 0.1 M glucose is not isotonic with 0.1 M KCl solutions. Why?

2.What will happen if blood cells are placed in saline water (hypertonic solution)

3. A solution containing 1·9 g per 100 mL of KCl (M = 74·5 g mol^{-1}) is isotonic with a solution containing 3 g per 100 mL of urea (M = 60 g mol^{-1}). Calculate the degree of dissociation of KCl solution. Assume that both the solutions have same temperature.

OR

Calculate the molality of ethanol solution in which mole fraction of water is 0.88.

22. Read the given passage and answer the questions that follow: (1x4)

Alcohols play very important role in our daily life. Ordinary sprit used as an antiseptic contains methanol. Ethanol is present in cough syrups, tonics, wine, beer and whisky, Sugar, starch, cellulose are carbohydrates which also contain large number —OH groups. Phenol is also an antiseptic in low concentration (0.2%) where as 2% solution of phenol is used as disinfectant. The fragrance of rose is due to citronellol (unsaturated alcohol). Phenol is used for preparation of many useful compounds like aspirin, methyl salicylate (Iodex) and phenyl salicylate (salol) used as intestinal antiseptic.

(*a*) How is phenol prepared from cumene? What is advantage of this method?

(b) How is phenol converted into salicylic acid?

(c) Give a chemical test to distinguish between phenol and benzyl alcohol?

(d) Why does phenol turn pink after long standing?

SECTION E

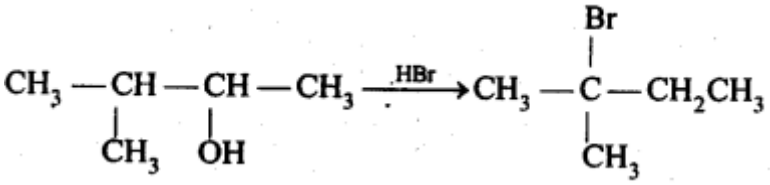
23.(a) How are the following conversions carried out? **(2+2+1)**
(i) Propene to propan-1-ol
(ii) Ethyl magnesium chloride to propan-1-ol.

(b) Write the mechanism of acid dehydration of ethanol to yield ethene.
(c) Arrange the following compounds in the increasing order of their acid strength: p-cresol, p-nitrophenol, phenol

OR

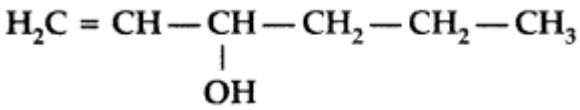
(a) Name the reagents used in the following reactions**:** **(2+2+1)**
(i) Bromination of phenol to 2,4,6-tribromophenol
(ii) Butan-2-one to butan-2-ol .

(b) When 3-methylbutant 2-ol is treated with HBr, the following reaction takes place:



Give a mechanism for this reaction.

(c) Give the IUPAC name of the following :



24.(a) How can the following conversions be carried out : **(2+2+1)**
(i) Aniline to bromobenzene
(ii) Chlorobenzene to 2-chloroacetophenone
(iii) Chloroethane to butane

(b) Rearrange the compounds of each of the following sets in order of reactivity towards S_N2 displacement :
2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane

(c) A hydrocarbon C_5H_{12} gives only one mono-chlorination product. Identify the hydrocarbon.