



ANANDALAYA
SUMMATIVE ASSESSMENT - 1
Class : XII

Subject: CHEMISTRY

M.M: 70

Date 19/09/ 2016

Time: 3 Hour

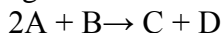
General Instructions:

1. All questions are compulsory.
2. Marks for each question are indicated against it.
3. Question numbers 1 to 5 are very short answer questions, carrying 1 mark each. Answer these in one word or about one sentence each.
4. Question numbers 6 to 10 are short answer questions, carrying 2 marks each. Answer these in about 30 words each.
5. Question numbers 11 to 22 are short answer questions carrying 3 marks each. Answer these in about 40 words each.
6. Question number 23 is value based question and carries 4 marks.
7. Question numbers 24 to 26 are long answer questions carrying 5 marks each. Answer these in about 70 words each.
8. Use log tables, if necessary. Use of calculator is not permitted.

- 1 Give IUPAC name of: $\text{H}_2\text{C}=\text{CH}-\text{CH}(\text{OH})-\text{CH}_2-\text{CH}_2-\text{CH}_3$. (1)
- 2 Which compound undergoes faster $\text{S}_{\text{N}}2$ reaction, in the following pair of halogen compounds? (1)
 $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{CH}_3$ or $\text{C}(\text{CH}_3)_3\text{Br}$
- 3 At the same temperature, hydrogen is more soluble in water than helium. Which of them has higher value of K_{H} and why? (1)
- 4 How much charge is required for reduction of 1 mol of MnO_4^- to Mn^{2+} ? (1)
- 5 Write the name and product formed when semicarbazide ($\text{NH}_2\text{CONHNH}_2$) react with formaldehyde. (1)
- 6 A reaction is of second order with respect to a reactant. How is its rate affected if the concentration of the reactant is (i) doubled (ii) reduced to half? (2)
(OR)
A first order reaction is 15% complete in 20 min. How long will it take to be 60% complete?
- 7 Write equations involved in preparation of 1-propoxypropane from propan-1-ol. (2)
- 8 Complete the following reactions: (2)
(i) $\text{C}_6\text{H}_5\text{NH}_2 + \text{CHCl}_3 + \text{alc. KOH} \rightarrow$
(ii) $\text{C}_6\text{H}_5\text{N}_2\text{Cl} + \text{H}_3\text{PO}_2 + \text{H}_2\text{O} \rightarrow$
- 9 How are the following colloids different from each other with respect to dispersion medium and dispersed phase? Give one example of each type. (2)
(i) An aerosol (ii) An emulsion
- 10 The vapour pressure of 2% aqueous solution of a non volatile substance X at 373K is 755 torr. Calculate molar mass of solute. Vapour pressure of pure water at 373K is 760 torr. (2)

- 11 How are colloids classified on the basis of the nature of interaction between dispersed phase and dispersion medium? Describe an important characteristic of each class. Which of these sol need stabilizing agents for preservation? (3)
- (OR)
- Define the following terms giving an example of each:
- (i) Associated colloids (ii) Lyophilic sol (iii) Adsorption
- 12 i) What type of deviation from Raoult's law is observed, when two volatile liquids A and B on mixing produce a warm solution? Explain with the help of a well labelled vapour pressure graph. (3)
- ii) What is Van't Hoff factor.
- 13 The electrical resistance of a column of 0.05 M caustic soda solution of diameter 1cm and length 50 cm is 5.55×10^3 ohm. Calculate its resistivity, conductivity and molar conductivity. (3)
- 14 Predict the product of following (3)
- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{-O-CH}_3 + \text{HBr} \rightarrow$
- (b) $\text{C}_6\text{H}_5\text{-O-C}_2\text{H}_5 + \text{HBr} \rightarrow$
- (c) $(\text{CH}_3)_3\text{C-O-C}_2\text{H}_5 + \text{HI} \rightarrow$
- 15 The rate of a reaction becomes four times when the temperature changes from 293 K to 313 K. Calculate the energy of activation (E_a) of the reaction assuming that it does not change with temperature. (3)
- [$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$, $\log 4 = 0.6021$]
- 16 (a) Define Molal elevation constant (K_b). (3)
- (b) A solution containing 15 g urea (molar mass = 60 g mol^{-1}) per litre of solution in water has the same osmotic pressure (isotonic) as a solution of glucose (molar mass= 180 g mol^{-1}) in water. Calculate the mass of glucose present in one litre of its solution.
- 17 (i) Arrange the following in order of increasing boiling point: (3)
- 1-chloropropane, isopropylchloride, 1- chlorobutane
- (ii) Amongst the isomeric dihalobenzenes which isomer has the highest melting point and why?
- (iii) Arrange the following haloalkanes in the increasing order of density. Justify your answer.
- CCl_4 , CH_2Cl_2 and CHCl_3 .
- 18 An organic compound (A) has characteristic odour. On treatment with NaOH, it forms compounds (B) and (C). Compound (B) has molecular formula $\text{C}_7\text{H}_8\text{O}$ which on oxidation gives back compound (A). The compound (C) is a sodium salt of an acid. When (C) is treated with soda-lime, it yields an aromatic compound (D). Deduce the structures of (A), (B), (C) and (D). Write the sequence of reactions involved. (3)
- 19 (a) Give one chemical test to distinguish between the following pairs of compounds: (3)
- (i) Methylamine and dimethylamine.
- (ii) Aniline and ethylamine
- (b) Write the structures of different isomers corresponding to the molecular formula $\text{C}_3\text{H}_9\text{N}$, which will liberate nitrogen gas on treatment with nitrous acid
- 20 Write the equations involved in the following reactions: (3)
- (i) Reimer –Tiemann reaction (ii) Williamson's ether synthesis
- (iii) Nitration of anisole

- 21 The following results have been obtained during the kinetic study of the reaction: (3)



Experiment	[A] / M	[B] / M	Initial rate of formation of D / M min ⁻¹
I	0.1	0.1	$6.0 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$
II	0.3	0.2	$7.2 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$
III	0.3	0.4	$2.88 \times 10^{-1} \text{ mol L}^{-1} \text{ min}^{-1}$
IV	0.4	0.1	$2.4 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$

Determine the rate law, order and the rate constant for the reaction.

- 22 Illustrate the following with suitable examples each (3)

- (i) Hoffmann's bromamide reaction
- (ii) Coupling reaction
- (iii) Acylation reaction

- 23 On visit to your native village, you find that lot of smoke, dust and some other gases are coming out of the chimney of a recently set up factory near the village which is the cause of many respiratory problems for the people living there. Answer the following questions (4)

(i) As a chemistry student, what method you will suggest the factory owner to manage dust and smoke?

(ii) What is the basic principle involved in your suggestion?

(iii) What values are associated with your advice?

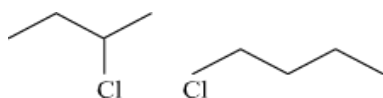
- 24 (a) Write the mechanism of hydration of ethene to form ethanol. (5)

(b) How are the following conversions carried out?

(i) Propene to propan-2-ol.

(ii) Isopropyl alcohol to iodoform.

(c) Identify the chiral molecule in the following pair:



(OR)

(a) Write the mechanism of the reaction of HI with methoxymethane.

(b) How are the following conversions carried out?

(i) Ethanol to but-1-yne.

(ii) Aniline to chlorobenzene.

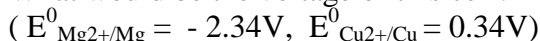
(c) What happens when n-butylchloride is treated with alc. KOH?

- 25 a) Define molar conductivity of a substance and describe how for weak and strong electrolytes, molar conductivity changes with concentration of solute. How is such change explained? (5)

b) A voltaic cell is set up at 25°C with the following half cells:



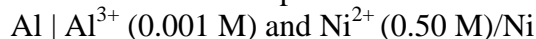
What would be the voltage of this cell?



(OR)

a) Define conductivity. State the relationship amongst the cell constant of a cell, the resistance of the solution in the cell and the conductivity of the solution. How is molar conductivity of a solute related to the conductivity of its solution?

b) A voltaic cell is set up at 25°C with the following half-cells:



Calculate the cell voltage.



- 26 (a) Account for the following: (5)
- (i) Chloroacetic acid is more stronger than acetic acid.
 - (ii) Aldehyde are more reactive than ketones towards nucleophiles.
 - (iii) Aldehydes are more volatile than the corresponding alcohols.
- (b) Give simple test to distinguish between the following pairs of ompounds.
- (i) Propanal and propanone
 - (ii) Phenol and benzoic acid

OR

- (a) Give explanation for each of the following:
- (i) Cyclohexanone forms cyanohydrin in good yield but 2, 2, 6-trimethyl cyclohexanone does not.
 - (ii) There are two $-NH_2$ groups in semicarbazide. However, only one is involved in the formation of semicarbazones.
 - (iii) During the preparation of esters from a carboxylic acid and an alcohol in the presence of an acid catalyst, the water or the ester should be removed as fast as it is formed.
- (b) Give simple test to distinguish between the following pairs of ompounds.
- (i) Propanal and Diethyl ether
 - (ii) Methyl acetate and ethyl acetate