

B-9-X

Roll No.

Total No. of Questions : 4]

[Total No. of Printed Pages : 8

12thARM(SZ)JKUT2024**1109-X****CHEMISTRY**

[Maximum Marks : 70

Instructions :

There are total four Sections in the question paper. All questions are compulsory.

Section-A contains 10 Objective Type Questions (Multiple Choice Questions) of 1 mark each. $1 \times 10 = 10$ marks

(iii) **Section-B** contains 9 Very Short Answer Type Questions of 2 marks each to be answered in 20-30 words.

 $2 \times 9 = 18$ marks

(iv) **Section-C** contains 9 Short Answer Type Questions of 3 marks each to be answered in 100-150 words. $3 \times 9 = 27$ marks

(v) **Section-D** contains 3 Long Answer Type Questions of 5 marks each to be answered in 150-200 words. $5 \times 3 = 15$ marks

(vi) Use log table if necessary. Use of scientific calculators is not allowed.

12thARM(SZ)JKUT2024-1109-X**B-9-X**

Turn Over



SECTION-A

1 each

**OBJECTIVE TYPE QUESTIONS
(MULTIPLE CHOICE QUESTIONS)**

1. Select the correct one :

(i) In which mode of expression the concentration of solution remain independent of temperature ?

- (A) Molarity
- (B) Normality
- (C) Formality
- (D) Molality

(ii) If an aqueous solution of glucose is allowed to freeze, then crystals of which will be separated out first ?

- (A) Glucose
- (B) Water
- (C) Both of these
- (D) None of these

(iii) The amount of an ion liberated on an electrode during electrolysis does not depend upon :

- (A) Current strength
- (B) Conductance of the solution
- (C) Time
- (D) Electrochemical equivalent of the element

(iv) Collision theory is applicable to :

- (A) First order reaction
- (B) Zero order reaction
- (C) Bimolecular reaction
- (D) Intramolecular reaction

(v) Alkyl halides undergoing nucleophilic bimolecular substitution involve :

- (A) Formation of carbocation
- (B) Racemic mixture
- (C) Inversion of configuration
- (D) Retention of configuration

(vi) Among the following compounds strongest acid is :

- (A) $\text{HC} \equiv \text{CH}$
- (B) C_6H_6
- (C) C_2H_6
- (D) CH_3OH

(vii) The weakest base among the following is :

- (A) Dimethylamine
- (B) Aniline ✗
- (C) Methylamine
- (D) Ethylamine

(viii) A transition metal exists in its highest oxidation state. It is expected to behave as :

- (A) A chelating agent
- (B) A central metal in a coordination compound
- (C) An oxidising agent
- (D) A reducing agent

(ix) The human body does not produce :

- (A) Enzymes
- (B) DNA
- (C) Vitamins
- (D) Hormones

(x) Adenosine is an example of :

- (A) Nucleotide
- (B) Nucleoside
- (C) Purine base
- (D) Pyrimidine base

SECTION-B

2 each

VERY SHORT ANSWER TYPE QUESTIONS

2. (i) What is the difference between Rate Law and Law of Mass Action ?
- (ii) What is meant by didentate and ambidentate ligands ?
- (iii) Why are alcohols less acidic than water ?
- (iv) What is diazotisation ?
- (v) Write *two* main functions of carbohydrates in plants.
- (vi) Write IUPAC names of :
- (a) $[\text{CrCl}_2(\text{en})(\text{NH}_3)_2]^+$
- (b) $\text{K}_3[\text{Fe}(\text{CN})_6]$
- (vii) Why molecularity is applicable only for elementary reactions and order is applicable for elementary and as well as complex reactions ?
- (viii) How does average rate of reaction differ from instantaneous reaction rate ?
- (ix) Why are haloarenes less reactive than haloalkanes towards nucleophilic substitution reactions ?

SECTION-C

3 each

SHORT ANSWER TYPE QUESTIONS

3. (i) Formic acid (methanoic acid) is stronger acid than acetic acid (ethanoic acid). Explain.
- (ii) Define conductivity and molar conductivity for the solution of an electrolyte.
- (iii) Explain the following about transition metals :
- (a) Magnetic behaviour
 - (b) Oxidation states
- (iv) How is potassium dichromate prepared from chromite ore ? Give its three oxidising properties. <https://www.jkboseonline.com>
- (v) Discuss briefly giving an example in each case the role of co-ordination compounds in :
- (a) Biological system
 - (b) Medicinal chemistry
- (vi) How will you convert ethyl bromide to :
- (a) Ethane
 - (b) Ethoxyethane
 - (c) Ethanenitrile ?

(vii) What are phenols ? How do they differ structurally from aromatic alcohols ?

(viii) What is Hinsberg's reagent ? How will you distinguish between primary, secondary and tertiary amines by it ?

(ix) What are α -amino acids ? How are they related to proteins ?
Give the structure of two amino acids ?

SECTION-D

5 each

LONG ANSWER TYPE QUESTIONS

4. (i) Define :

(a) Mole fraction

(b) Molality

(c) Molarity

Calculate the mole fraction of ethylene glycol ($C_2H_6O_2$) in a solution containing 20% of $C_2H_6O_2$ by mass.

Or

Define and explain elevation in boiling point. How can you calculate the molecular mass of a non-volatile solute with it ?

(ii) Define Kohlrausch's law. How does it help in :

- (a) Calculation of λ° for a weak electrolyte
- (b) Degree of dissociation of a weak electrolyte ?

Or

What are fuel cells ? Describe $H_2 - O_2$ fuel cell.

(iii) Describe the following :

- (a) Esterification
- (b) Cannizzaro reaction
- (c) Cross aldol condensation
- (d) Decarboxylation

Or

- (a) Write *five* methods for the preparation of aldehydes.
- (b) How are aldehydes distinguished from ketones using Tollen and Fehling's reagents ? Give chemical reactions.

B-9-Y

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12th ARM(SZ)JKUT2024

1109-Y

CHEMISTRY

Time : 3 Hours]

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B-9-Y

Turn Over

SECTION-A

1 each

OBJECTIVE TYPE QUESTIONS
(MULTIPLE CHOICE QUESTIONS)

1. Select the correct one :

(i) Molarity of the liquid HCl if density of the solution is 1.17 g/cc is :

- (A) 36.5
(B) 18.5
(C) 32.05
~~(D) 42.10~~

(ii) Which of the following is a colligative property ?

- (A) Boiling point
(B) Freezing point
~~(C) Osmotic pressure~~
(D) Vapour pressure

(iii) The potential of hydrogen electrode at pH = 10 is :

- (A) 0.59 V
~~(B) 0.00 V~~
(C) -0.59 V
(D) -0.059 V

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(iv) Rate constant of a reaction (K) is $175 \text{ litre}^2 \text{ mol}^{-2} \text{ sec}^{-1}$. What is the order of the reaction ?

(A) First

(B) Second

(C) Third

(D) Zero

(v) The ease of dehydrohalogenation of alkyl halides with alcoholic KOH is :

(A) $3^\circ < 2^\circ < 1^\circ$

(B) $3^\circ > 2^\circ > 1^\circ$

(C) $3^\circ < 2^\circ > 1^\circ$

(D) $3^\circ > 2^\circ < 1^\circ$

(vi) Which of the following compounds can be used as anti-freeze in automobile radiators ?

(A) Methyl alcohol

(B) Ethylene glycol

(C) Nitrophenol

(D) Ethyl alcohol

~~(vii)~~ Which of the following is the strongest base in aqueous solution ?

- ~~(A)~~ Methylamine
- (B) Trimethylamine
- (C) Aniline
- (D) Dimethylamine

~~(viii)~~ Antibodies are :

- (A) Carbohydrate
- ~~(B)~~ Proteins
- (C) Lipids
- ~~(D)~~ Enzymes

~~(ix)~~ Vitamin A is :

- (A) Ascorbic acid
- ~~(B)~~ Retinol
- (C) Calciferol
- (D) Thiamine

~~(x)~~ The maximum oxidation state of osmium is :

- (A) +6
- (B) +7
- (C) +8
- ~~(D)~~ +5

SECTION-B

2 each

VERY SHORT ANSWER TYPE QUESTIONS

2. (i) Activation energy of a reaction is zero. Will the rate constant of the reaction depends on temperature ? Give reason.
- (ii) Explain with two examples each of the following :
- (a) Coordination entity
 - (b) Coordination number
- (iii) Why 1° alcohols are more acidic than 2° alcohols ?
- (iv) What is Sandmeyer's reaction ?
- (v) Write two main functions of carbohydrates in plants.
- (vi) Write IUPAC names of :
- (a) $[\text{CrCl}_2(\text{en})(\text{NH}_3)_2]^+$
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SECTION-D

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LONG ANSWER TYPE QUESTIONS

4. (i) Define :

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(iii) Describe the following :

- (a) Esterification
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- (c) Cross aldol condensation
- (d) Decarboxylation

Or

- (a) Write *five* methods for the preparation of aldehydes.
- (b) How are aldehydes distinguished from ketones using Tollen and Fehling's reagents ? Give chemical reactions.

B-9-Z

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1109-Z

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B-9-Z

Turn Over



SECTION-A

1 each

OBJECTIVE TYPE QUESTIONS
(MULTIPLE CHOICE QUESTIONS)

1. Select the correct one :

(i) The molarity of 900 g of water is :

- (A) 50 M
- (B) 55.5 M
- (C) 5 M
- (D) Cannot be calculated

(ii) The depression in freezing point for 1 M urea, 1 M glucose and 1 M NaCl are in the ratio :

- (A) 1 : 2 : 3
- (B) 3 : 2 : 2
- (C) 1 : 1 : 2
- (D) None of these

(iii) In the electrolytic cell, flow of electrons is from :

- (A) Cathode to anode in the solution
- (B) Cathode to anode through external supply
- (C) Cathode to anode through internal supply
- (D) Anode to cathode through external supply

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B-9-Z

(iv) The time required for 100 percent completion of a zero order reaction is :

(A) $\frac{2K}{a}$

(B) $\frac{a}{2K}$

(C) $\frac{a}{K}$

(D) aK

(v) Among the following, the molecule with highest dipole moment is :



(vi) Phenol reacts with bromine in chloroform at low temperature to give :

(A) *m*-bromophenol

(B) Mixture of ortho and para-bromophenol

(C) *p*-bromophenol

(D) 2, 4, 6-tribromophenol

(vii) Strongest base is :

- (A) $C_6H_5NH_2$
- (B) $CH_2=CHCH_2NH_2$
- (C) $HC=CCH_2NH_2$
- (D) $CH_3CH_2CH_2NH_2$

(viii) $KMnO_4$ on heating to red hot gives :

- (A) $K_2MnO_4 + MnO_2 + O_2$
- (B) $K_2MnO_3 + MnO_2 + O_2$
- (C) $K_2O + MnO_2 + O_2$
- (D) None of these

(ix) Nitrogen base that is found in RNA but absent in DNA is :

- (A) Uracil
- (B) Thymine
- (C) Cytosine
- (D) Adenine

(x) Deficiency of Vitamin B_1 causes the disease :

- (A) Convulsion
- (B) Beri-Beri
- (C) Cheilosis
- (D) Sterility

SECTION-B

2 each

VERY SHORT ANSWER TYPE QUESTIONS

2. (i) What is the effect of temperature on the rate of reaction ?
- (ii) What is the difference between inner and outer orbital complexes ?
- (iii) Direct nitration of aniline is not carried out at all. Explain why.
- (iv) How will you synthesise salicylic acid from phenol ?
- (v) Write *two* main functions of carbohydrates in plants.
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SECTION-C

3 each

SHORT ANSWER TYPE QUESTIONS

3. (i) Explain the following about acetic acid :
- (a) Its boiling point is higher than that of *n*-propanol
 - (b) It is weaker than chloroacetic acid and formic acid
 - (c) Acetic acid is a stronger than phenol.
- (ii) Define conductivity and molar conductivity for the solution of an electrolyte.
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