

B-9-Y

Roll No.

Total No. of Questions : 4]

[Total No. of Printed Pages : 8

12thARM(SZ)JKUT2024

1109-Y

CHEMISTRY

Time : 3 Hours]

[Maximum Marks : 70

General Instructions :

- (i) There are total four Sections in the question paper. All questions are compulsory.
- (ii) **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-Y

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

(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 :
- Coordination entity
 - 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 :
- $[\text{CrCl}_2(\text{en})(\text{NH}_3)_2]^+$
 - $\text{K}_3[\text{Fe}(\text{CN})_6]$
- (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.

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12thARM(SZ)JKUT2024—1109-Y

B-9-Y

B-9-Z

Roll No.

Total No. of Questions : 4]

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12thARM(SZ)JKUT2024

1109-Z

CHEMISTRY

Time : 3 Hours]

[Maximum Marks : 70

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

12thARM(SZ)JKUT2024-1109-Z

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**

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

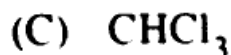
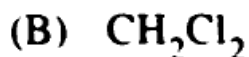
(A) $\frac{2K}{a}$

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

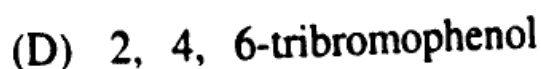
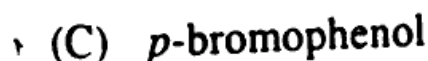
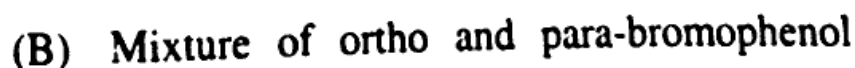
(C) $\frac{a}{K}$

(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 :



(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.
- (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) 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.
- (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 :
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SECTION-D

5 each

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- (d) Decarboxylation

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- (b) How are aldehydes distinguished from ketones using Tollen and Fehling's reagents ? Give chemical reactions.

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12thARM(SZ)JKUT2024—1109-Z

B-9-Z

F-9-A

Roll No.

Total No. of Questions : 4+28]

[Total No. of Printed Pages : 15

XIIAP/Bi.AUTJKL24

1709-A

CHEMISTRY

(New/Old Course)

Time : 3 Hours]

[Maximum Marks : 70

NOTE :— The questions in the question paper are based on revised and pre-revised syllabus marked as "New Course" and "Old Course" respectively and candidates are advised to appear in the relevant course meant for them. Candidates who may attempt the questions partly from "New Course" and partly from "Old Course" will not be awarded. Candidates are also advised to record "New Course" or "Old Course" as the case may be, on the front page of the answer-book.

XIIAP/Bi.AUTJKL24—1709-A (New)

F-9-A

Turn Over

(New Course)**General Instructions :**

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- (v) Section–D contains 3 long answer type questions of 5 marks each to be answered in 150–200 words. $5 \times 3 = 15$
- (vi) Use of log tables, if necessary, use of Scientific Calculators is not allowed.

Section–A**(Objective Type/Multiple Choice Questions)**

1 each

1. Select the correct one :

- (i) The osmotic pressure of a solution is directly proportional to :
 - (A) The molecular concentration of the solute
 - (B) The absolute temperature at a given concentration
 - (C) The lowering of vapour pressure
 - (D) All of these

- (ii) Which of the following 0.1 M aqueous solutions will have the lowest freezing point ?
- (A) Potassium sulphate (B) Sodium Chloride
(C) Urea (D) Glucose
- (iii) The cell reaction $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$ is best represented by :
- (A) $\text{Cu} | \text{Cu}^{2+} || \text{Zn}^{2+} | \text{Zn}$ (B) $\text{Pt} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Pt}$
(C) $\text{Zn} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Cu}$ (D) Any of these
- (iv) A first order has half life period of 34.65 seconds. Its rate constant is :
- (A) $3 \times 10^{-2} \text{ s}^{-1}$ (B) $4 \times 10^{-2} \text{ s}^{-1}$
(C) 20 s^{-1} (D) $2 \times 10^{-2} \text{ s}^{-1}$
- (v) The general outer electronic configuration of transition element is :
- (A) $(n-1) d^{1-10} ns^1$ (B) $(n-1) d^{10} ns^2$
(C) $(n-1) d^{1-10} ns^{1-2}$ (D) $(n-1) d^5 ns^1$
- (vi) Haloalkanes in the presence of alcoholic KOH under go :
- (A) Polymerisation (B) Elimination
(C) Substitution (D) Dimerisation

(vii) Alcohol which is used as beverage is :

- | | |
|----------------|-----------------|
| (A) Methanol | (B) Ethanol |
| (C) Butan-1-ol | (D) Propan-1-ol |

(viii) Benzene diazonium chloride reacts with phenol to give :

- | | |
|---------------------------|-------------------|
| (A) p-hydroxy azo-benzene | (B) Phenol |
| (C) Chloral | (D) Nitro-benzene |

(ix) Maltose is made of :

- | | |
|-----------------------------|-------------------------------------|
| (A) Two α -D glucose | (B) α and β -D glucose |
| (C) Glucose and fructose | (D) Fructose only |

(x) Vitamin B1 is :

- | | |
|----------------|----------------|
| (A) Riboflavin | (B) Cobalamine |
| (C) Thiamine | (D) Pyridoxine |

Section-B

(Very Short Answer Type Questions)

2 each

2. (i) Define activation energy of a reaction. Why different reactions proceed at different speeds ?
- (ii) Define half life period. How can you find the half life period of a first order reaction ?

- (iii) How does rate law differ from law of mass action ?
- (iv) Give two main basic postulates of Werner's theory of co-ordination compounds.
- (v) Write IUPAC names of :
- (a) $[\text{Co}(\text{NH}_3)_6]^{3+}$
- (b) $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$
- (vi) Give the uses and environmental effects of D.D.T.
- (vii) Explain briefly the dehydration of ethylalcohol with H_2SO_4 at temperature 443K and 413K.
- (viii) What are Amines ? How are they classified ?
- (ix) What are carbohydrates ? How are they classified ?

Section-C

(Short Answer Type Questions)

3 each

3. (i) Define the terms :
- (a) Cell constant
- (b) Molar conductivity
- (c) Corrosion

- (ii) What is lanthanide contraction ? How is it caused ?
- (iii) What are transition elements ? Why are they called *d*-block elements ? Write the electronic configuration of the 1st and last member of 3*d* transition series.
- (iv) Define the following terms with examples :
- (a) Ionisation isomerism.
 - (b) Bidentate ligand
- (v) How will you convert ethyl bromide into :
- (a) Ethylnitrite
 - (b) Ethylcarbylamine
 - (c) Ethene ?
- (vi) How is phenol converted into :
- (a) Salicylaldehyde
 - (b) Phenylacetate ?

- (vii) Aldehydes are more reactive than ketones. Explain. Give reasons.
- (viii) What are diazonium salts ? How benzene diazonium chloride react with KI on warming ?
- (ix) Describe the secondary structure of Proteins.

Section-D

(Long Answer Type Questions)

5 each

4. (i) State and explain depression in freezing point. Derive the relationship between depression in freezing point and molar mass of solute. <https://www.jkboseonline.com>

Or

What is Van't Hoff factor ? How is it related to degree of dissociation of the electrolyte in the solution ? What is its value when solute undergoes association and dissociation ?

- (ii) State and explain Faraday's Laws of electrolysis. What is meant by electrochemical equivalent ?

Or

Explain the term Electrode potential and e.m.f. of a cell. Discuss Nernst equation for the cell potential.

(iii) What happens when Acetone is treated with :

- (a) Sodium bisulphite
- (b) Hydrazine
- (c) Grignard reagent
- (d) Hydroxylamine
- (e) Hydrogen cyanide ?

Or

Give two methods of preparation of carboxylic acids. How they react with :

- (a) NaOH
- (b) NH_3
- (c) $\text{C}_2\text{H}_5\text{OH}/\text{H}_2\text{SO}_4$?

F-9-B

Roll No.

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XIIAP/Bi.AUTJKL24

1709-B

CHEMISTRY

(New/Old Course)

Time : 3 Hours]

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XIIAP/Bi.AUTJKL24—1709-B (New)

Turn Over

F-9-B

(New Course)

General Instructions :

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- (vi) Use of log tables, if necessary, use of Scientific Calculators is not allowed.

Section–A

(Objective Type/Multiple Choice Questions)

1 each

1. Select the correct one :

- (i) The increase in the temperature of the aqueous solution will result in its :
 - (A) Molarity to increase
 - (B) Molarity to decrease
 - (C) Mole fraction to increase
 - (D) Mass percentage to increase

- (ii) Which of the following 0.1 M aqueous solutions will have the highest freezing point ?
- (A) Potassium sulphate (B) Sodium chloride
(C) Urea (D) BaCl_2
- (iii) Zinc is used to protect iron from corrosion because :
- (A) E_{oxi} of Zn is less than E_{oxi} of Fe
(B) E_{red} of Zn is less than E_{red} of Fe
(C) Zn is cheaper than Fe
(D) Zn is abundantly available
- (iv) The half life period is independent of initial concentration of reactants for :
- (A) First order reaction (B) Second order reaction
(C) Zero order reaction (D) Third order reaction
- (v) Which one of the following does not show different oxidation states ?
- (A) Iron (B) Copper
(C) Zinc (D) Manganese
- (vi) Methyl chloride reacts with silver acetylide to form :
- (A) Acetylene (B) Ethylene
(C) Propyne (D) Propylene

(vii) Phenol is used in the manufacture of :

- | | |
|--------------|-----------------|
| (A) Bakelite | (B) Polystyrene |
| (C) PVC | (D) Nylon |

(viii) Ethylamine reacts with nitrosyl chloride to give :

- | | |
|-------------------|------------------|
| (A) Ethylchloride | (B) Ethylalcohol |
| (C) Ethylnitrite | (D) Nitroethane |

(ix) Which of the following monosaccharides is an aldopentose ?

- | | |
|---------------|---------------|
| (A) Glucose | (B) Fructose |
| (C) Arabinose | (D) Galactose |

(x) The deficiency of vitamin C causes :

- | | |
|--------------|-----------------------|
| (A) Rickets | (B) Scurvy |
| (C) Pyorrhea | (D) Pernicious anemia |

Section-B

(Very Short Answer Type Questions)

2 each

2. (i) The rate constant for a first order reaction is 0.0005 min^{-1} . Calculate its half life period.
- (ii) Write Arrhenius equation showing the effect of temperature on the reaction rate. What do different symbols signify ?

- (iii) Define first order reaction. What are the units of K for first order and zero order reactions ?
- (iv) Define with one example the following :
- (a) Complex ion
 - (b) Coordination compound
- (v) Write IUPAC names of :
- (a) $[\text{Co}(\text{NH}_3)_6]^{3+}$
 - (b) $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$
- (vi) Give the uses and environmental effects of D.D.T.
- (vii) Explain briefly the dehydration of ethylalcohol with H_2SO_4 at temperature 443K and 413K.
- (viii) What are Amines ? How are they classified ?
- (ix) What are carbohydrates ? How are they classified ?

Section-C

(Short Answer Type Questions)

3 each

3. (i) State Kohlrausch's law of independent migration of ions. Mention one application of this law.

- (ii) What is Lanthanide contraction ? How is it caused ?
- (iii). What are transition elements ? Why are they called *d*-block elements ? Write the electronic configuration of the 1st and last member of 3*d* transition series.
- (iv) Define the following terms with examples :
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Section-D

(Long Answer Type Questions)

5 each

4. (i) State and explain depression in freezing point. Derive the relationship between depression in freezing point and molar mass of solute. <https://www.jkboseonline.com>

Or

What is Van't Hoff factor ? How is it related to degree of dissociation of the electrolyte in the solution ? What is its value when solute undergoes association and dissociation ?

- (ii) State and explain Faraday's Laws of electrolysis. What is meant by electrochemical equivalent ?

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