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12 -B
Rollno -16

RYAN GROUP OF SCHOOLS
ACADEMIC YEAR 2025-26
CBSE, PRE-BOARD-1 EXAMINATION

STD : XII
SUB : CHEMISTRY (SET-B)

MARKS : 70
TIME : 3 HRS.

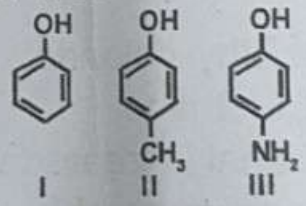
General Instructions :
Read the following instructions carefully.

a. *There are 33 questions in this question paper. All questions are compulsory.*
b. *Section A: Question 1 to 16 are MCQs questions carrying 1 mark each.*
c. *Section B: Q. No. 17 to 21 are short answer questions and carry 2 marks each.*
d. *Section C: Q. No. 22 to 28 are short answer questions and carry 3 marks each.*
e. *Section D: Q. No. 29 and 30 are case-based questions and carry 4 marks each.*
f. *Section E: Q. No. 31 to 33 are long answer questions carrying 5 marks each.*
g. *There is no overall choice. However, internal choices have been provided.*
h. *Use of calculators is not permitted.*

SECTION - A

Q.1 The correct acidic strength order of the following is

a) I > II > III
b) III > I > II
c) II > III > I
d) I > III > II

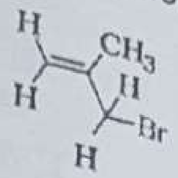


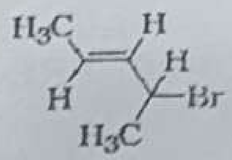
I II III

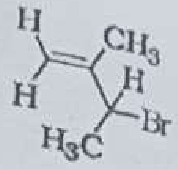
Q.2 The cell reaction of the galvanic cell- $Cu(s)/Cu^{2+}(aq)$ // $Hg^{2+}(aq)/Hg(l)$ is

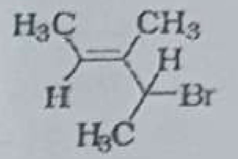
a) $Hg + Cu^{2+} \rightarrow Hg^{2+} + Cu$
b) $Hg + Cu^{2+} \rightarrow Cu^{+} + Hg^{+}$
c) $Cu + Hg \rightarrow CuHg$
d) $Cu + Hg^{2+} \rightarrow Cu^{2+} + Hg$

Q.3 Which of the following is 4-bromopent-2-ene?

A. 

B. 

C. 

D. 

Q.4 Which of the following statements about a lead storage battery is false?

a) It is a primary cell.
b) The cathode is made up of lead (IV) oxide.
c) The anode is made up of lead.
d) The electrolyte used is an aqueous solution of sulphuric acid.

Q.5 Which of the following solutions shows negative deviation from Raoult's law-

a) Acetone & chloroform
b) Benzene & toluene
c) Ethanol & water
d) Carbon tetrachloride & chloroform

Q.6 Mole fraction of ethyl chloride and methanol in a ternary solution is 0.6 and 0.32 respectively. What is the mole fraction of third component. Also identify the solvent in this ternary solution.

a) 0.03, Ethyl chloride b) 0.08, cannot be determined
c) 0.03, Methanol d) 0.08, Ethyl chloride

Q.7 When ethanal is treated with methyl magnesium iodide in ethereal medium and Mg-complex thus formed is hydrolysed in acidic medium gives________

A) iso-propyl alcohol B) tert-butyl alcohol
C) sec-butyl alcohol D) n-butyl alcohol

Q.8 A reaction is first order in A and second order in B, when the concentration of both A and B are tripled the rate of reaction becomes

a) 3 times
b) 9 times
c) 18 times
d) 27 times

Q.9 Which of the following statement is correct for the catalyst?

a) It doesn't alter ΔG of the reaction
b) It does not change the equilibrium constant of a reaction
c) It provides an alternate mechanism by reducing activation energy between reactants and products
d) All the above

Q.10 Which of the following are pyrimidine bases?

(A) Guanine & adenine
(B) Adenine & Cytosine
(C) Thymine & Cytosine
(D) Uracil & Guanine

Q.11 Which of the following deficiency causes scurvy-

(A) Aspartic acid
(B) Ascorbic acid
(C) Adipic acid
(D) Saccharic acid

Q.12 Match the properties given in column I with the metals in column II

	Column I	Column II
i)	An element that can show +8 oxidation state	A. Mn
ii)	3d block element that can show up to +7	B. Cr
iii)	3d block element with the highest melting point	C. Os
		D. Fe

a) i)-C ; ii)-D; iii) -B
b) i)-B ; ii)-C; iii)-D
c) i)-A ; ii)-C; iii) –B
d) i)-C ; ii)-A; iii)-B

For questions 13 to 16, two statements labelled as Assertion (A) and Reason (R) are given, select the most appropriate answer from the options given below:

a) Both A and R are true statements and R is the correct explanation of A.

b) Both A and R are true statements but R is not the correct explanation of A.

c) A is true statement but R is false.

d) A is false statements but R is true.

Q.13 **Assertion (A)**: For weak electrolytes, there is a slow increase in molar conductivity with dilution and can be represented by the equation $\Lambda^\circ m = \Lambda m - Ac^{½}$.
Reason (R): The value of the constant 'A' for NaCl, $CaCl_2$, and $MgSO_4$ in a given solvent and at a given temperature is different.

Q.14 **Assertion (A)**: Potassium dichromate is a good oxidising agent in acidic medium.
Reason (R): Dichromate readily reduces to Cr^{3+} in acidic medium.

Q.15 **Assertion (A)**: Carboxylic acids are first converted to ester, before reduction to alcohols.
Reason (R): $LiAlH_4$, the reagent required for direct conversion of carboxylic acids to alcohols is expensive.

Q.16 **Assertion (A)**: Carboxylic acids do not undergo Friedel - Crafts reaction.
Reason (R): Carboxyl group is meta-directing group.

SECTION - B

Q.17 Give reason for any two of the following:

a) Scuba divers carry He diluted air.

b) Ethylene glycol is added to water in car radiators.

c) Wilted flowers revive when their stem is dipped in water.

Q.18 Carry out the following conversions:

i) Ethanol to But-1-yne

ii) 2-Chloropropane to Propan-1-ol

Q.19 Calculate Λm° for $CaCl_2$ if $\Lambda m^\circ (Ca^{2+}) = 119.0$ S cm^2 mol^{-1} & $\Lambda m^\circ (Cl^-) = 76.3$ S cm^2 mol^{-1}.

OR

a) Mercury cell gives constant voltage throughout it's life. Explain why?

b) What are the two types of cells electrochemistry deals with?

Q.20 a) What are the two consequences of lanthanoid contraction?

b) Complete & balance the following reaction:

$MnO_4^{1-} + C_2O_4^{2-} + H^+ \rightarrow$

Q.21 Write one example of :

i) Hell-Volhard-Zelinsky reaction

ii) Rosenmund reduction

SECTION - C

Q.22 a) Draw the structure of DDT.

b) An organic compound A with the molecular formula $(-)C_4H_9Br$ undergoes hydrolysis to form only $(+)C_4H_9OH$. Give the structure of A and write the mechanism of the reaction with proper three dimensional structure.

Q.23 Give the structures of A, B and C in any two of the following reactions:

i) $CH_3-CH_2-I \xrightarrow{NaCN} A \xrightarrow{OH\text{-partial hydrolysis}} B \xrightarrow{NaOH+Br_2} C$

ii) $C_6H_5-NO_2 \xrightarrow{Fe/HCl} A \xrightarrow{NaNO_2+HCL\ 273K} B \xrightarrow{H_2O/\Delta} C$

iii) $C_6H_5NH_2 + CHCl_3 + \text{alc KOH} \rightarrow A \xrightarrow{H_2\backslash Pt} B \xrightarrow{CH_3Cl} C$

Q.24 Account for the following:

a) Cu^+ ion is not stable in aqueous solutions.

b) The orange-red colour of potassium dichromate solution turns yellow when alkali is added to it.

c) Of the d^4 species, Cr^{2+} is strongly reducing while manganese(III) is strongly oxidizing.

Q.25 19.5g of CH_2FCOOH (M= 78g/mol) is dissolved in 500g of water. The depression in the freezing point of water observed is 1.0°C. Calculate the van's Hoff factor and dissociation constant of fluoroacetic acid.(K_f for water is 1.86 KKg /mol)

OR

a) Define osmotic pressure.

b) Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 (M=174g/mol) in 2 litre of water at 25°C, assuming that it is completely dissociated.

Q.26 **Arrange the following:**

a) In decreasing order of basic strength in aqueous phase
$C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ and NH_3

b) In increasing order of solubility in water
$C_2H_5NH_2$, $(C_2H_5)_2NH$ and $(C_2H_5)_3N$

c) In increasing order of basic strength:
Aniline, p-nitroaniline and p-toluidine

OR

Give plausible explanation for each of the following:

a) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis.

b) There are two $-NH_2$ groups in semicarbazide but only one is used in nucleophilic addition reaction.

c) Meta nitroaniline is formed in appreciable amount during nitration of aniline.

Q.27 i) Arrange the following alcohols in order of their increasing acid strength:
CH_3CH_2OH, CF_3CH_2OH, CCl_3CH_2OH.

ii) Give reason for the following:

a) The alcohol prepared by the process of fermentation of molasses turned sour to taste.

b) When Methoxybenzene is treated with HI, Phenol is formed instead of methanol.

Q.28 a) What type of isomerism is shown by the given complex: $[Co(NH_3)_5Br]\ SO_4$ and also write the formula of the isomer?

b) Write the hybridization of $[Ni(Cl)_4]^{-2}$ and predict its magnetic behaviour. [Atomic no. Ni = 28]

Q.29 Re...

SECTION - D

Q.29 Read the following paragraph and answer questions no. i) to iv) based on it-

It is well known that transition metals form complexes. In modern terminology, these complexes are called coordination compounds. These compounds are present in biological systems also like chlorophyll, haemoglobin and vitamin B_{12}. Some non-transition metals also form complexes like chlorophyll. Though complexes are formed from two or more simple salts, yet they differ from double salts in a number of ways especially in their dissociation. In coordination compounds, a number of neutral or cationic species are linked to the central metal atom by coordinate bonds. Such species are called ligands. Ligands may be monodentate or bidentate or polydentate. Bidentate and polydentate ligands generally form chelates. Some unidentate ligands may have more than one coordinating atom. These are called ambidentate ligands. The number of unidentate ligands attached to the central metal atom is called its coordination number. The net charge carried by the metal atom is called its oxidation number. IUPAC has recommended some definite rules to write the names of coordination compounds when formula is given or vice versa.

i) The IUPAC name of the complex $[Pt(NH_3)_3Br(NO_2)Cl]Cl$ is:

(a) triammine chloro bromido nitro platinum (IV) chloride

(b) triammine bromido nitro chloro platinum (IV) chloride

(c) triammine bromido chloridonitrito-N-platinum (IV) chloride

(d) triammine nitrito-N-chlorido bromido platinum (IV) chloride

ii) Aluminium reacts with NaOH & forms compound 'X'. If the coordination number of Al in 'X' is 6, the correct formula of 'X' is:

a) $[Al(H_2O)_4(OH)_2]^{1-}$ b) $[Al(H_2O)_3(OH)_2]$

c) $[Al(H_2O)_2(OH)_4]^{1-}$ d) $[Al(H_2O)_3](OH)]_3$

Choose the correct option for iii) & iv) out of the four options given below:

(a) Both Assertion (A) and Reason (R) are true statements and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true statements but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true statement but Reason (R) is false.

(d) Assertion (A) is false statement but Reason (R) is true.

iii) **Assertion**: Both oxalate ion and sulphate ion are bidentate ligands.

Reason: Both oxalate ion and sulphate ion carry charge equal to –2.

iv) **Assertion**: $[Fe(C_2O_4)_3]^{3-}$ is more stable than $[Fe(H_2O)_6]^{3+}$.

Reason: The ligand C_2O_4 carries two units of –ve charge whereas the ligand H_2O is neutral.

Q.30 Rahul set up an experiment to find resistance of aqueous KCl solution for different concentrations at 298 K using a conductivity cell connected to a Wheatstone bridge. He fed the Wheatstone bridge with a.c. power in the audio frequency range 550 to 5000 cycles per second. Once the resistance was calculated from null point he also calculated the conductivity κ and molar conductivity Λm and recorded his readings in tabular form.

S.No.	Conc.(M)	k S cm^{-1}	Λm S cm^2mol^{-1}
1	1.00	111.3×10^{-3}	111.3
2	0.10	12.9×10^{-3}	129.0
3	0.01	1.41×10^{-3}	141.0

Answer the following questions:

(a) Why does Molar conductivity increases though the conductivity decreases with dilution?

(b) If $\Lambda^\circ m$ of KCl is 150.0 S cm^2 mol^{-1}, calculate the degree of dissociation of 0.01 M KCl .

(c) If Rahul had used HCl instead to KCl then would you expect the Λm values to be more or less than those of KCl for a given concentration. Justify.

OR

(c) Amit, a classmate of Rahul repeated the same experiment with CH_3COOH solution instead of KCl solution. Give one point that would be similar and one that would be different in his observations as compared to Rahul.

SECTION - E

Q.31 i) In a double stranded DNA molecule, the percentage of cytosine is 18. What would be thepercentage of adenine?

ii) Glucose is correctly named as D(+) - glucose. What does D and (+) stand for?

iii) Identify and give any one point of difference between the protein present in the hair and protein present in egg albumin.

iv) Both glucose and sucrose have aldehydic group, then why does only glucose reduces Fehling's Reagent and not sucrose?

v) Doctor advised a 50 year old woman enough exposure to sunlight and addition of fish and egg yolk to her diet. What is the possible disease diagnosed by the doctor?

OR

I. A fragment of DNA strand has the following sequence: 5'-ATGCTA-3'. Write the sequence of the complementary strand.

II. What are anomers? Give example.

III. Identify and give any one point of difference between the carbohydrate present in cane sugar and carbohydrate present in milk.

IV. Write the structure of dipeptide formed by the following amino acids.

H_2N-CH_2-COOH Glycine	$H_2N-CH(CH_3)-COOH$ Alanine

V. Ashish's gums bleed frequently. The doctor's prescription mentioned that Ashish is suffering from scurvy. Help him to identify two food sources to help him recover faster.

Q.32 i) By giving reasons, explain how the rate of the reaction for a given reaction will be affected when :

(a) the temperature at which the reaction was taking place is decreased.

(b) a catalyst is added.

ii) The following data were obtained during the kinetic studies of the reaction : $A+2B \rightarrow C+2D$

Expt	Initial [A] $MolL^{-1}$	Initial [B] $MolL^{-1}$	Initial rate $MolL^{-1}Sec^{-1}$
1	0.1	0.1	$3x10^{-4}$
2	0.3	0.3	$9x10^{-4}$
3	0.1	0.3	$3x10^{-4}$
4	0.2	0.4	$6x10^{-4}$

Determine the order of reaction with respect to each reactant and the overall order of the reaction. Write the rate law expression for the reaction.

OR

I. a) Write the difference between elementary and complex reaction.

b) Write the units of rate constant for a reaction, if Rate = $k\,[A][B]^{1/2}$ & concentration of A & B is expressed in moles/ L.

II. The rate of a reaction triples when the temperature changes from 298 K to 318 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature. (Given R = 8.314 $JK^{-1}mol^{-1}$, log 3 = 0.4771)

Q.33 i) Write a chemical test to distinguish between Acetophenone and benzophenone.

ii) Complete the reaction

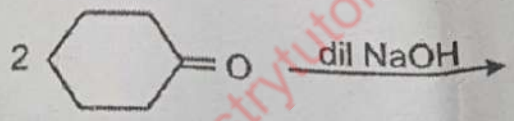
$$(CH_3)_3C\text{–}CHO + (CH_3)_3C\text{-}CHO \xrightarrow{\text{Conc.KOH}}$$

iii) An organic compound with the molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollen's reagent, and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. Identify the compound and write any three of the four reactions mentioned in the question.

OR

a) Write a chemical test to distinguish between Methanoic acid and Ethanoic acid.

b) Complete the reaction



c) An organic compound (A) (molecular formula $C_8H_{16}O_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B} and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration gives but-l-ene. Write equations for the reactions involved.

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