

BHARTIYA SHIKSHA BOARD
SAMPLE QUESTION PAPER 2025-26
CLASS - XII
CHEMISTRY (151)

Max. Marks: 70

Time: 3 Hours

General Instructions:

Read the following instructions carefully

(a) There are 33 questions in this question paper with internal choice.

(b) Section A consists of 16 multiple-choice questions carrying 1 mark each.

(c) Section B consists of 5 short answer questions carrying 2 marks each.

(d) Section C consists of 7 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 3 long answer questions carrying 5 marks each.

(g) All questions are compulsory.

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

Section A

The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

1. An electrochemical cell can behave like an electrolytic cell when

1

(a) $E_{\text{cell}} = 0$

(b) $E_{\text{cell}} = E_{\text{ext}}$

(c) $E_{\text{cell}} > E_{\text{ext}}$

(d) $E_{\text{cell}} < E_{\text{ext}}$

2. With the increase in temperature, the rate of the reaction increases. This is due to:

1

(a) increase in concentration

(b) increase in collision frequency

(c) increase in activation energy

(d) decrease in activation energy

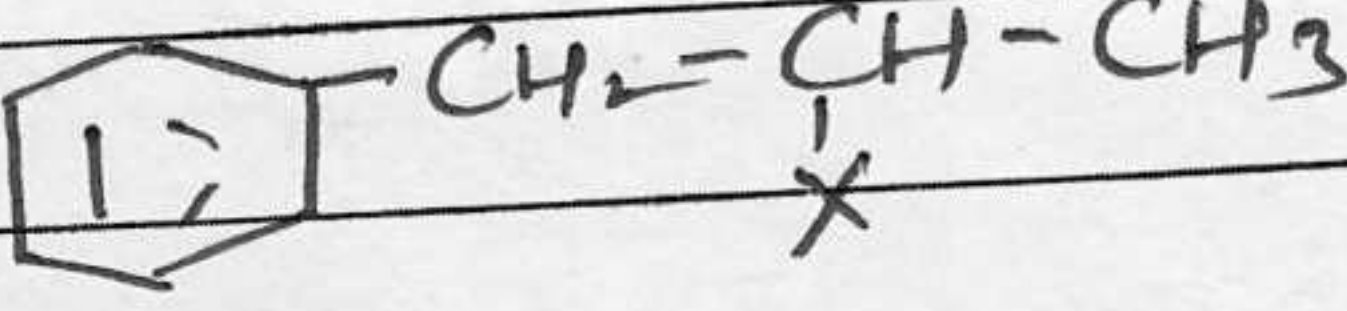
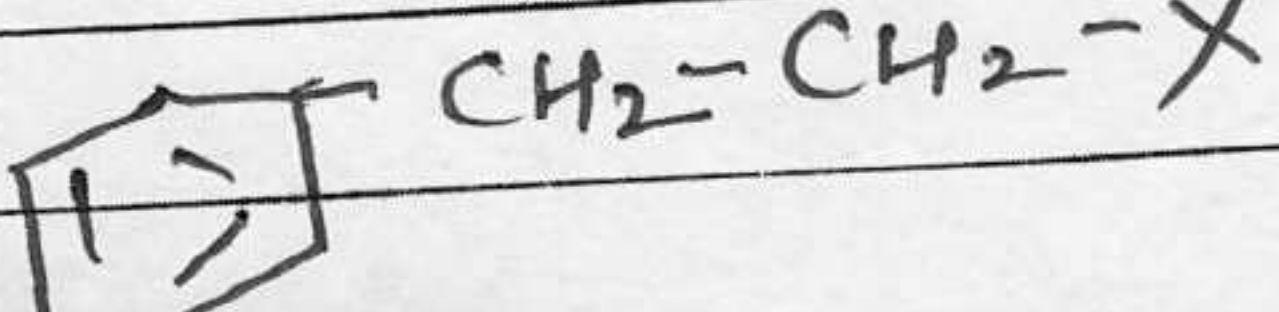
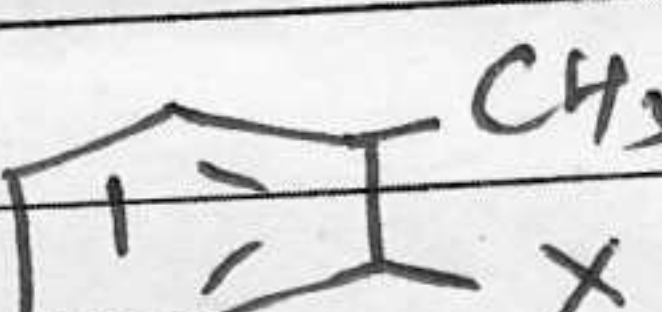
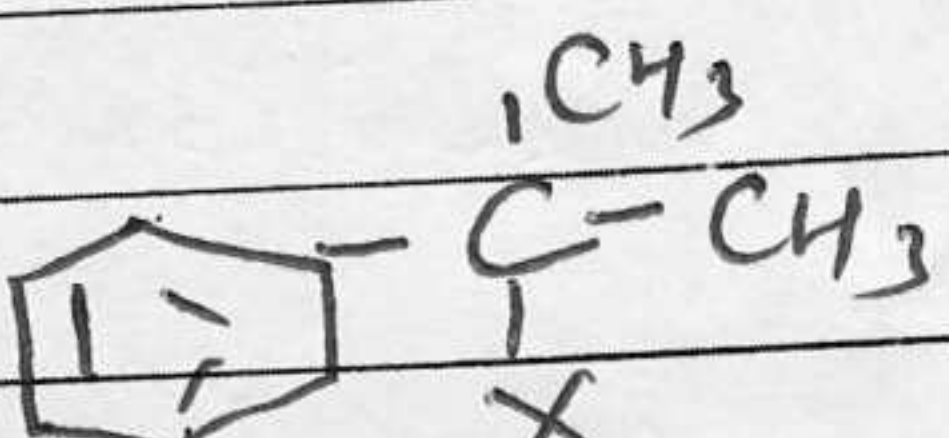
3. The highest oxidation state of a metal is exhibited in its:

1

(a) sulphides and oxides.

Q.No.	Question	Marks
	(b) sulphides and fluorides	
	(c) oxides and fluorides	
	(d) oxides and chlorides	
4.	SN ₁ mechanism is favored in:	1
(a)	Polar solvents	
(b)	non-polar solvents	
(c)	presence of any type of solvent	
(d)	absence of solvent	
5.	The decreasing order of boiling point of the following alcohols is:	1
(a)	3-Methylbutan-2-ol, 2-Methylbutan-2-ol > pentanol	
(b)	Pentanol > 3-Methylbutan-2-ol > 2-Methylbutan-2-ol	
(c)	2-Methylbutan-2-ol > 3-Methylbutan-2-ol > Pentanol	
(d)	2-Methylbutan-2-ol > Pentanol > 3-Methylbutan-2-ol	
6.	An organic compound 'A' on ozonolysis gave acetone and propanal. The IUPAC name of 'A' is:	1
(a)	Pent-1-ene	
(b)	Pent-2-ene	
(c)	2-Methylpentene	
(d)	2-Methylpent-2-ene	

Question		Marks										
Q.No.												
7.	A polypeptide is made up of 6 amino acids. The number of peptide bonds present in this polypeptide is:	1										
(a)	4											
(b)	5											
(c)	6											
(d)	7											
8.	The reagent which is used in the Hinsberg's Test is:	1										
(a)	$C_6H_5NHCH_3$											
(b)	$C_6H_5SO_3H$											
(c)	$C_6H_5COCH_3$											
(d)	$C_6H_5SO_2Cl$											
9.	Reactant A undergoes a decomposition reaction. The concentration of A was measured periodically. Observe the data carefully and predict the rate law for this decomposition reaction.	1										
	<table><tr><th>Time (Hours)</th><th>[A] M</th></tr><tr><td>0</td><td>0.80</td></tr><tr><td>1</td><td>0.40</td></tr><tr><td>2</td><td>0.20</td></tr><tr><td>3</td><td>0.10</td></tr></table>	Time (Hours)	[A] M	0	0.80	1	0.40	2	0.20	3	0.10	
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0	0.80											
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3	0.10											

Q.No.	Question	Marks
(a)	$\text{Rate} = k[A]$	
(b)	$\text{Rate} = k[A]^2$	
(c)	$\text{Rate} = 2k[A]$	
(d)	$\text{Rate} = \frac{1}{2} k[A]$	
10.	Identify the benzylic halide	1
(a)		
(b)		
(c)		
(d)		
11.	For the conversion of Benzene into m-bromoniline the correct sequence of reactions to be performed is	
(a)	nitration, reduction, bromination	1
(b)	bromination, nitration, reduction	
(c)	nitration, bromination, reduction	
(d)	reduction, nitration, bromination	

Q.No.	Question	Marks
12.	For the reaction $A + 2B \rightarrow C + D$, the order of the reaction is	1
(a)	one with respect to A	
(b)	two with respect to B	
(c)	three	
(d)	can't be predicted.	
13.	Assertion (A): Aliphatic primary amines can be prepared by Gabriel phthalimide synthesis. Reason (R): Alkyl halide undergoes nucleophilic substitution with anion formed by phthalimide. Select the most appropriate answer from the options given below:	1
(a)	Both A and R are true and R is the correct explanation of A.	
(b)	Both A and R are true but R is not the correct explanation of A.	
(c)	A is true but R is false	
(d)	A is false but R is true.	
14.	Assertion [A]: Benzaldehyde is less reactive than acetaldehyde towards nucleophilic attack.	1

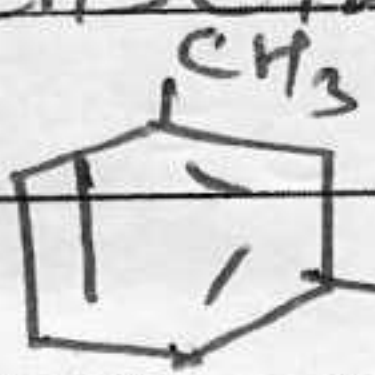
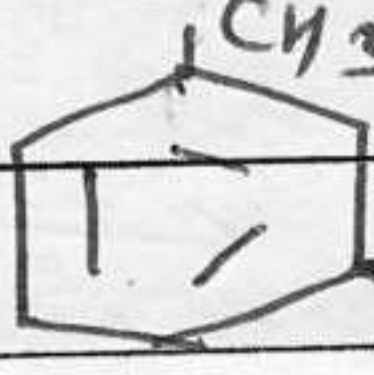
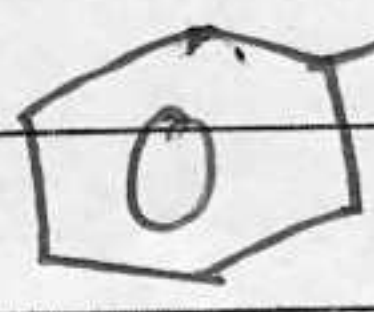
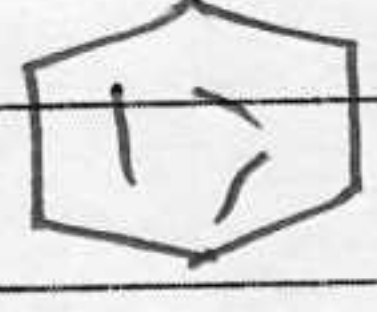
Q.No.	Question	Marks
14	Reason (R): All the carbon atoms of benzaldehyde are sp^2 hybridized. Select the most appropriate answer from the options given below:	
(a)	Both A and R are true and R is the correct explanation of A.	
(b)	Both A and R are true but R is not the correct explanation of A.	
(c)	A is true but R is false.	
(d)	A is false but R is true.	
15	Assertion (A): The rate constant of a pseudounimolecular reaction has the units of the rate constant of a second first order reaction. Reason (R): A pseudounimolecular reaction is a reaction of second order in which one of the reactant is present in large excess. Select the most appropriate answer from the options given below:	1
(a)	Both A and R are true and R is the correct explanation of A.	
(b)	Both A and R are true but R is not the	

Q.No.	Question	Marks
	correct explanation of A.	
(c)	A is true but R is false	
(d)	A is false but R is true.	
16.	Assertion(A): KCN reacts with CH_3Cl to give CH_3NC . Reason(R): CN^- is an ambident nucleophile. Select the most appropriate answer from the options given below:	1
(a)	Both A and R are true and R is the correct explanation of A.	
(b)	Both A and R are true but R is not the correct explanation of A.	
(c)	A is true but R is false.	
(d)	A is false but R is true	
Section B		
This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.		
17.	A 4% solution of glucose is isotonic with 3% solution of an organic compound. Calculate the molar mass of the unknown substance.	2

Q.No.	Question	Marks
	[Given: Atomic mass of C=12, H=1, O=16 g/mol] Or	
	At a temperature of 25°C , the mole fraction of nitrogen in air is 0.78 with a total pressure of 1 atm. If the value of Henry's constant for nitrogen is $8.42 \times 10^7 \text{ M/mmHg}$ then calculate the concentration of nitrogen in water at room temperature.	2
18.	Write the hydrolysis products of:	2
(a)	Sucrose	1
(b)	Lactose	1
19.	Give the example of structural formulae of pair of coordination compounds which show following isomerism:	2
(a)	Coordination Isomerism	1
(b)	Solvate isomerism.	1
20.	Give plausible explanation for the following:	2
(a)	Transition metals and their compounds act as good catalyst.	1
(b)	4d & 5d series of transition metals have	

Q.No.	Question	Marks
	more frequent metal-metal bonding in their compounds than 3d metal compounds.	
21.	Calculate EMF of the following cell $\text{Zn(s)} \text{Zn}^{2+}(0.1\text{M}) \text{Sn}^{2+}(0.001\text{M}) \text{Sn(s)}$ Given $E^\circ_{\text{Zn}^{2+}/\text{Zn}} = -0.76\text{V}$ $E^\circ_{\text{Sn}^{2+}/\text{Sn}} = -0.14\text{V}$	2
Section C		
This section contains 7 questions with internal choice in one question. The following questions are short answer type and carry 3 marks each.		
22.	How much time is required for 1.5g of Ag to deposit when 1.50 A current is passed through an electrolytic cell containing AgNO_3 solution with inert electrode? [Atomic mass of Ag, N & O are 108, 14 & 16 g/mol respectively]	3
23.	The rate of a reaction triples when temperature is increased from 17°C to 27°C. Calculate the energy of activation of	3

Q.No.	Question	Marks
	this reaction. [Given $2.303 R = 19.15 \text{ JK}^{-1} \text{ mol}^{-1}$, $\log 3 = 0.48$]	
24.	Write the structure of major organic product in each of the following reactions:	3
(a)	$(\text{CH}_3)_3\text{CBr} + \text{KOH} \xrightarrow{\text{ethanol}, \Delta}$	1
(b)	$\text{CH}_3(\text{CH}_2\text{CH}_2)_2\text{Cl} + \text{NaI} \xrightarrow{\text{acetone}, \Delta}$	1
(c)	$\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)_2 + \text{HBr} \longrightarrow$	1
	Or	
24.	A hydrocarbon of molecular mass 72 g mol^{-1} gives a single monochloroderivative & two dichloroderivatives on photochlorination. Give the structure & IUPAC name of the hydrocarbon. Also give reason for the deduction of the structure.	3
25.	Give plausible explanation for each of the following:	3
(a)	Cyclohexanone forms cyanohydrin in good yield but 2,2,6-trimethylcyclohexanone does not.	1

Q.No.	Question	Marks
(b)	There are two $-NH_2$ group in semicarbazide, however only one is involved in the formation of semicarbazone.	1
(c)	During the preparation of ester, the water of ester formed should be removed as soon as it is formed.	1
26.	Write chemical equations for the following conversions:	3
(a)	CH_3CH_2Cl into $CH_3CH_2CH_2NH_2$	1
(b)	 NH_2 into  NO_2	1
(c)	 $CONH_2$ into 	1
27.	Which acid of each pair shown here would you expect to be stronger? Why?	3
(a)	CH_3COOH or FCH_2COOH	1
(b)	$FCH_2CH_2CH_2COOH$ or CH_3CHFCH_2COOH	1
(c)	FCH_2COOH or $ClCH_2COOH$	1
28.	A cell is prepared by dipping a copper rod in 1M $CuSO_4$ solution and a nickel rod in	3

Q.No.	Question	Marks
	1 M NiSO_4 solution. The standard reduction potentials of copper electrode and nickel electrode are 0.34 Volt and -0.25 volt respectively?	
(a)	Which electrode will be positive?	1
(b)	In which cell does reduction occur?	1
(c)	Give cell representation.	1

Section D

The following questions are case-based questions. Each question has an internal choice and carries 4(1+1+2) marks each. Read the passage carefully and answer the questions that follow.

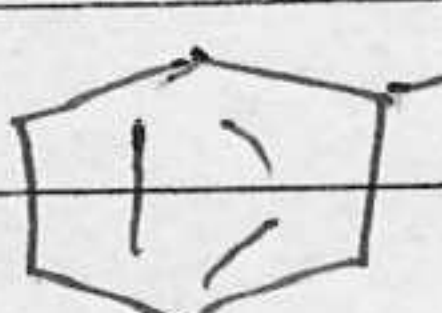
29. The particles in nucleus of the cell responsible for heredity which are made up of proteins and another type of biomolecules called nucleic acid. These are mainly of two types DNA and RNA. Nucleic acid on hydrolysis gives a pentose sugar, phosphoric acid and nitrogen containing heterocyclic compound. Nucleic acid found in all cells have a diverse set of functions

Q.No.	Question	Marks
	Such as cell creation, the storage and processing of genetic information, protein building and the generation of energy cell. Although their function may differ, the structures of DNA and RNA are very similar, with only a few fundamental differences in their molecular makeup differentiating them.	
(a)	Define nucleotide	1
(b)	List all the possible products which you'll get when a ^{RNA} sample containing Uracil is hydrolysed	1
(c)	Give one similarity and one difference between RNA & DNA.	2
30.	The oxidation number of the central atom in a complex is defined as the charge it would carry if all the ligands are removed along with the electron pairs that are shared with the central atom. Similarly, the charge on the complex is the sum of the charges of the	

Q.No.	Question	Marks
	constituent parts i.e. the sum of the charges on the central metal ion and its surrounding ligands. Based on this, the complex is called neutral if the sum of the charges of the constituents is equal to zero. However, for an anionic or cationic complex, the sum of the charges of the constituents is equal to the charge on the coordination sphere.	
(a)	Find the oxidation state and coordination number of central metal ion in $[\text{Co}(\text{H}_2\text{O})(\text{CN})(\text{en})_2]^{2+}$	2
(b)	Give IUPAC name of this compound	1
(c)	Define heteroleptic complex	1
	Section E	
	The following questions are long answer types and carry 5 marks each. All questions have an internal choice.	
31(a)	Out of acetic acid, trifluoroacetic acid,	2

Q.No.	Question	Marks
	which one will produce the greatest depression in freezing point of water and why?	
(b)	Determine the amount of CaCl_2 ($i=1.5$) dissolved in 2.5 liter of water such that its osmotic pressure is 0.75 atm at 27°C . [Given atomic mass of $\text{Ca}=40\text{g/mol}$, $\text{Cl}=35.5\text{g/mol}$, $R=0.0821\text{ L atm K}^{-1}\text{mol}^{-1}$]	3
	Or	
(a)	Derive the relationship between relative lowering of vapour pressure and mole fraction of volatile liquid.	2
(b)	The vap. pressure of a dilute aqueous solution of glucose is 750 mmHg at 373 K. Calculate the molality and mole fraction of the solute.	3
32(a)	Give plausible explanation for the following:	3
(i)	4d and 5d series of transition metals have more frequent metal metal bonding in their compounds than 3d metal compounds.	1
	Paramagnetic character in 3d transition series increases up to Mn & then decreases.	

Q.No.	Question	Marks
(i)	Cuprous chloride is colourless whereas cupric chloride is blue.	1
(ii)	Transition metal and their compounds act as good catalyst Show variable oxidation state.	1
(b)	What is the effect of H^+ ions on the solution of potassium manganate? Also give the structure of manganate ion.	2
	Or	
(a)	Compare the chemistry of actinoids with that of lanthanoids with special reference to	3
(i)	Electronic Configuration	
(ii)	Oxidation state	
(iii)	atomic & ionic sizes colour	
(b)	Complete the following reactions:	2
(i)	$Co_2O_7^{2+} + H^+ + I^- \rightarrow$	
(ii)	$MnO_4^- + H^+ + Fe^{2+} \rightarrow$	
33(a)	Predict the products of the following reactions:	3
(i)	$CH_3CH_2OCH_3 + HBr \rightarrow$	1

Q.No.	Question	Marks
(i)	 $+ \text{HBr} \longrightarrow$	1
(ii)	$(\text{CH}_3)_3\text{C}-\text{OC}_2\text{H}_5 + \text{HBr} \longrightarrow$	1
(b)	Write a short note on the following name reactions	2
(i)	Kolbe's reaction	1
(ii)	Hydroboration oxidation	1
	Or	
(a)	An organic compound 'A' reacts with PCl_5 to produce another compound 'B'. 'B' reacts with magnesium metal in the presence of ether to produce a Grignard reagent 'C'. 'C' reacts with ethanal and the product is hydrolysed to produce Propan-2-ol. Identify 'A', 'B' and 'C'. Justify your answer by giving proper chemical reactions.	3
(b)	Give a chemical test to distinguish between following pair of compounds:	2

