

SPECTRA CLASSES PRACTICE PAPER 2025-26

CLASS: XII

SUBJECT: CHEMISTRY (043)

M.M:70

Time: 3Hr.

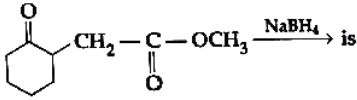
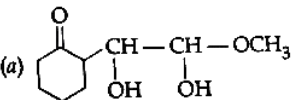
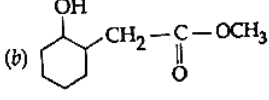
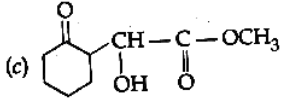
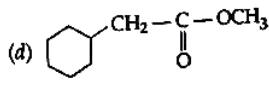
General Instructions:

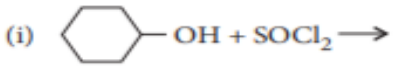
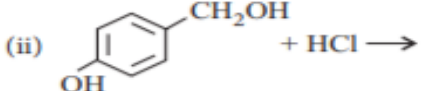
- (a) There are 33 questions in this question paper with internal choice.
 (b) SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
 (c) SECTION B consists of 5 short answer questions carrying 2 marks each.
 (d) SECTION C consists of 7 short answer questions carrying 3 marks each.
 (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.	For a spontaneous reaction the ΔG , equilibrium constant (K) and E°_{cell} will be respectively. (a) -ve, < 1, -ve (b) -ve, > 1, -ve (c) -ve, > 1, +ve (d) +ve, > 1, -ve	1
2.	Increasing order of rate of HCN addition to compound (I-IV) is (i) HCHO (ii) CH_3COCH_3 (iii) PhCOCH_3 (iv) PhCOPh (a) $\text{iv} < \text{ii} < \text{iii} < \text{i}$ (b) $\text{iv} < \text{iii} < \text{ii} < \text{i}$ (c) $\text{iii} < \text{iv} < \text{ii} < \text{i}$ (d) $\text{i} < \text{ii} < \text{iii} < \text{iv}$	1
3.	Which of the following base is not present in RNA? (a) adenine (b) uracil (c) thymine (d) cytosine	1
4.	Which of the following is a weaker acid than phenol? (a) 4-Methoxyphenol (b) 3, 5-dinitrophenol (c) 4-Methylphenol (d) 4-Nitrophenol	1
5.	In $\text{S}_\text{N}2$ reactions, the correct order of reactivity for the following compounds: (i) CH_3Cl (ii) $(\text{CH}_3)_3\text{CCl}$ (iii) $(\text{CH}_3)_2\text{CHCl}$ (iv) $\text{CH}_3\text{CH}_2\text{Cl}$ (a) $\text{i} > \text{ii} > \text{iii} > \text{iv}$ (b) $\text{iv} > \text{iii} > \text{ii} > \text{i}$ (c) $\text{i} > \text{iv} > \text{iii} > \text{ii}$ (d) $\text{iv} > \text{i} > \text{ii} > \text{iii}$	1
6.	When KMnO_4 solution is added to oxalic acid solution, the decolourisation is slow in the beginning but becomes instantaneous after some time because: (a) CO_2 is formed as the products (b) Reaction is exothermic (c) MnO_4^- catalysis the reaction (d) Mn^{2+} acts as autocatalyst	1
7.	The rate constant of a reaction becomes equal to the pre exponential factor when: (a) the absolute temperature is zero (b) the activation energy is infinity (c) the absolute temperature is infinity (d) the activation energy is zero	1
8.	Method by which aniline can not be prepared is: (a) reduction of nitrobenzene with H_2/Pd in ethanol. (b) potassium salt of phthalimide treated with chlorobenzene (c) hydrolysis of phenyl isocyanide with acidic solution (d) degradation of benzamide with bromine in alkaline medium solution.	1
9.	Iodoform can be prepared from all except (a) butan-2-one (b) acetophenone (c) propan-2-ol (d) propan-1-ol	1
10.	Radioactive decay is an example of: (a) first order (b) second order (c) zero order (d) 0.5 order	1

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11.	<p>The structure of the product obtained in the reaction</p>  <p>(a) </p> <p>(b) </p> <p>(c) </p> <p>(d) </p>	1
12.	<p>Spin only magnetic moment value of Cr^{3+} ion is</p> <p>(a) 2.87 B.M (b) 3.87 B.M (c) 3.47 B.M (d) 3.57 B.M</p>	1
13.	<p>Given below are two statements labelled as Assertion (A) and Reason (R)</p> <p>Assertion (A): o-nitrophenol and p-nitrophenol can be separated by steam distillation.</p> <p>Reason (R): O-isomer is steam volatile due to chelation and p-isomer is not steam volatile</p> <p>Select the most appropriate answer from the options given below:</p> <p>(a) Both A and R are true and R is the correct explanation of A</p> <p>(b) Both A and R are true but R is not the correct explanation of A.</p> <p>(c) A is true but R is false.</p> <p>(d) A is false but R is true.</p>	1
14.	<p>Given below are two statements labelled as Assertion (A) and Reason (R)</p> <p>Assertion (A): The α-hydrogen in carbonyl group is less acidic.</p> <p>Reason (R): The anion formed after loss of α-H atom is resonance stabilised.</p> <p>Select the most appropriate answer from the options given below:</p> <p>(a) Both A and R are true and R is the correct explanation of A</p> <p>(b) Both A and R are true but R is not the correct explanation of A.</p> <p>(c) A is true but R is false.</p> <p>(d) A is false but R is true.</p>	1
15.	<p>Given below are two statements labelled as Assertion (A) and Reason (R)</p> <p>Assertion (A): Lower the activation energy, faster is the reaction</p> <p>Reason (R): Catalyst does not affect activation energy of the reaction.</p> <p>Select the most appropriate answer from the options given below:</p> <p>(a) Both A and R are true and R is the correct explanation of A</p> <p>(b) Both A and R are true but R is not the correct explanation of A.</p> <p>(c) A is true but R is false.</p> <p>(d) A is false but R is true.</p>	1
16.	<p>Given below are two statements labelled as Assertion (A) and Reason (R)</p> <p>Assertion (A): During electrolysis of aqueous copper sulphate solution using copper electrodes hydrogen gas is released at the cathode.</p> <p>Reason (R): The electrode potential of Cu^{2+}/Cu is greater than that of H^+/H_2</p> <p>Select the most appropriate answer from the options given below:</p> <p>(a) Both A and R are true and R is the correct explanation of A</p> <p>(b) Both A and R are true but R is not the correct explanation of A.</p> <p>(c) A is true but R is false.</p>	1

	(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.	Rate constant k for first order reaction has been found to be $2.54 \times 10^{-3} \text{ sec}^{-1}$. Calculate its 3/4th life. ($\log 4 = 0.6020$)	2
18.	A 1.00 molal aqueous solution of trichloroacetic acid (CCl_3COOH) is heated to its boiling point. The solution has the boiling point of 100.18°C . Determine the van't Hoff factor for trichloroacetic acid. (K_b for water = $0.512 \text{ K kg mol}^{-1}$)	2
19.	Complete the following reaction equations : (i)  $\text{C}_6\text{H}_{11}\text{OH} + \text{SOCl}_2 \rightarrow$ (ii)  $\text{HO-C}_6\text{H}_4\text{-CH}_2\text{OH} + \text{HCl} \rightarrow$	2
20.	Write the equations involved in the following reactions : (i) HVZ reaction (ii) Rosenmund reaction OR Predict the products of the following reactions : (i) $\text{CH}_3\text{-C}(=\text{O})\text{-CH}_3 \xrightarrow[\text{(ii) KOH/Glycol, } \Delta]{\text{(i) H}_2\text{N-NH}_2} ?$ (ii) $\text{C}_6\text{H}_5\text{-CO-CH}_3 \xrightarrow{\text{NaOH/I}_2} ? + ?$	2
21.	Write down the structures and names of the products formed when D-glucose is treated with (i) Bromine water (ii) Hydrogen Iodide (Prolonged heating)	2
	SECTION C	
	This section contains 7 questions . The following questions are short answer type and carry 3 marks each.	
22.	Give mechanism of preparation of ethoxy ethane from ethanol.	3
23.	The rate constant of a first order reaction increases from 2×10^{-2} to 4×10^{-2} when the temperature changes from 300 K to 310 K. Calculate the energy of activation (E_a). ($\log 2 = 0.301$, $\log 3 = 0.4771$, $\log 4 = 0.6021$)	3
24.	Define the following terms as related to proteins : (i) Peptide linkage (ii) Primary structure (iii) Denaturation	3
25.	An organic compound (A) with molecular formula $\text{C}_8\text{H}_8\text{O}$ forms an orange red precipitate with 2, 4-DNP reagent and gives yellow precipitate on heating with I_2 and NaOH . It neither reduces Tollens' reagent nor Fehling's reagent, nor does it decolourise bromine water or Baeyer's reagent. On drastic oxidation with chromic acid, it gives a carboxylic acid (B) having molecular formula $\text{C}_7\text{H}_6\text{O}_2$. Identify the compounds (A) and (B) and explain the reactions involved.	3
26.	Write the name of the reaction, structure and IUPAC name of the product formed when (any 2): (a) phenol reacts with CHCl_3 in the presence of NaOH followed by hydrolysis.	3

	(b) Sodiumtertbutoxide reacts with C_2H_5Br (c) CH_3CH_2CN reacts with stannous chloride in the presence of hydrochloric acid followed by hydrolysis	
27	Calculate the strength of the current required to deposit 1.2 g of magnesium from molten $MgCl_2$ in 1 hour.	3
28	Deduce the (a) shape (b) magnetic behavior (c) Hybridisation of $[Co(NH_3)_4 Cl_2]^+$	3
	SECTION D The following questions are case -based questions. Each question carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.	
29	According to Valence Bond Theory theory, the metal atom or ion under the influence of ligands can use its (n-1)d, ns, np or ns, np, nd orbitals for hybridisation to yield a set of equivalent orbitals of definite geometry such as octahedral, tetrahedral, square planar and so on. These hybridised orbitals are allowed to overlap with ligand orbitals that can donate electron pairs for bonding. It is usually possible to predict the geometry of a complex from the knowledge of its magnetic behaviour on the basis of the valence bond theory. a). Is $[Co(NH_3)_6]^{+3}$ an inner orbital or outer orbital complex? b). Identify the magnetic behaviour of the complex $[Ni(CO)_4]$ c). Calculate the spin only magnetic moment of $[MnBr_4]^{2-}$ OR (c)State a reason for each of the following situations : (i) Co^{2+} is easily oxidised to Co^{3+} in presence of a strong ligand. (ii) The molecular shape of $Ni(CO)_4$ is not the same as that of $[Ni(CN)_4]^{2-}$	1+1+2
30	The concentration of potassium ions inside a biological cell is at least twenty times higher than the outside. The resulting potential difference across the cell is important in several processes such as transmission of nerve impulses and maintaining the ion balance. A simple model for such a concentration cell involving a metal M is $M(s) M^+(aq.; 0.05 \text{ molar}) M^+(aq; 1 \text{ molar}) M(s)$ (i) Which cell is used in hearing aids? (ii)What happens if external potential applied becomes greater than E° cell of electrochemical cell? (iii) standard electrode potential for Daniell cell is 1.1 V. Calculate the standard Gibbs energy for the cell reaction.	1+1+2
	SECTION E The following questions are long answer type and carry 5 marks each.	
31	(i) How is the vapour pressure of a solvent affected when a non-volatile solute is dissolved in it? (ii) What type of azeotrope is formed by positive deviation from Raoult's law? (iii) Calculate the freezing point of solution when 1.9 g of $MgCl_2$ ($M = 95 \text{ g mol}^{-1}$) was dissolved in 50 g of water, assuming $MgCl_2$ undergoes complete ionization. (K_f for water = $1.86 \text{ K kg mol}^{-1}$)	1+1+3
32	(i) Write down complete equation for the following reactions: (a) Oxidation of oxalate by $Cr_2O_7^{2-}$ in acidic medium. (b) Oxidation of $S_2O_3^{2-}$ by $KMnO_4$ (aq) neutral. (c) Decomposition of I^- in the presence of $KMnO_4$ in basic medium. (ii) Compare the chemistry of actinoids with that of the lanthanoids with special reference to: (a) Electronic configuration (b) Atomic and ionic sized	3+2

- (c) Oxidation state
(d) Chemical reactivity

33 (i) Give one chemical test to distinguish between the following pairs of compounds :

(a) Ethylamine and aniline (b) Aniline and N-methylaniline

(ii) Account for the following observations :

(i) pK_b for aniline is more than that for methylamine.

(ii) Methylamine solution in water reacts with ferric chloride solution to give a precipitate of ferric hydroxide.

(iii) Aniline does not undergo Friedel-Crafts reaction.

OR

(i) Write the chemical reaction stating the reaction conditions required for each of the following conversions :

(a) Aniline to chlorobenzene (b) Acetaldehyde to ethylamine

(ii) Write the structures of A, B and C in the following :

