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INDIAN SCHOOL SALALAH
FIRST TERM EXAMINATION – SEPTEMBER 2026



CHEMISTRY(043)

Class : XII

DATE: 16-09-2026

Time : 3 Hr

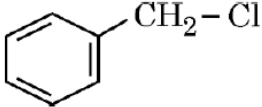
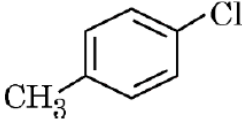
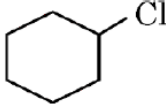
Maximum Marks: 70

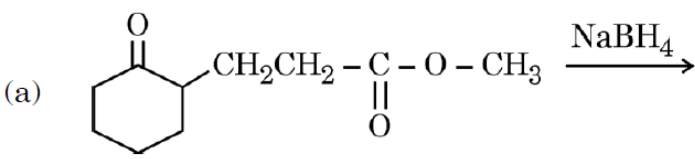
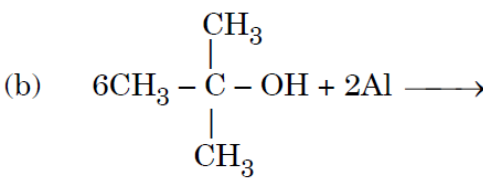
General Instructions :

Read the following instructions carefully and follow them :

- (i) This question paper contains 33 questions. All questions are compulsory.*
- (ii) This question paper is divided into five sections – Section A, B, C, D and E.*
- (iii) Section A – questions number 1 to 16 are multiple choice type questions. Each question carries 1 mark.*
- (iv) Section B – questions number 17 to 21 are very short answer type questions. Each question carries 2 marks.*
- (v) Section C – questions number 22 to 28 are short answer type questions. Each question carries 3 marks.*
- (vi) Section D – questions number 29 and 30 are case-based questions. Each question carries 4 marks.*
- (vii) Section E – questions number 31 to 33 are long answer type questions. Each question carries 5 marks.*
- (viii) There is no overall choice given in the question paper. However, an internal choice has been provided in few questions in all the sections except Section –A*
- (ix) Use of calculator is NOT allowed.*

SECTION A		
1.	In case of association, the abnormal molar mass of solute will (A) Increase (B) Decrease (C) Remain the same (D) First increase then decrease	1
2.	Choose the compound which is more acidic than phenol : (A) ethanol (B) o-nitrophenol (C) o-methylphenol (D) o-methoxyphenol	1
3.	A galvanic cell can behave as an electrolytic cell when : (A) $E_{\text{cell}} = E_{\text{ext}}$ (B) $E_{\text{cell}} > E_{\text{ext}}$ (C) $E_{\text{cell}} = 0$ (D) $E_{\text{ext}} > E_{\text{cell}}$	1

4.	The synthesis of alkyl fluoride is best obtained from : (A) Free radicals (B) Swarts reaction (C) Finkelstein reaction (D) Sandmeyer reaction	1
5.	Which of the following solutions will have the lowest freezing point in water ? (A) 0.1 M CaCl ₂ (B) 0.1 M Glucose (C) 0.1 M KCl (D) 0.1 M Urea	1
6.	Which of the following is 'not' true about enantiomers? (A) They have the same chemical reactivity. (B) They have the same melting or boiling point. (C) They have the same specific rotation. (D) They have the same refractive index.	1
7.	The correct cell to represent the following reaction is : $\text{Zn} + 2\text{Ag}^+ \rightarrow \text{Zn}^{2+} + 2\text{Ag}$ (A) $2\text{Ag} \text{Ag}^+ \text{Zn} \text{Zn}^{2+}$ (B) $\text{Ag}^+ \text{Ag} \text{Zn}^{2+} \text{Zn}$ (C) $\text{Ag} \text{Ag}^+ \text{Zn} \text{Zn}^{2+}$ (D) $\text{Zn} \text{Zn}^{2+} \text{Ag}^+ \text{Ag}$	1
8.	In the reaction of NaOBr with amide, the carbonyl carbon is lost as : (A) HCO ₃ ⁻ (B) CO ₃ ²⁻ (C) CO ₂ (D) CO	1
9.	The deficiency of which of the following vitamins causes increased fragility of red blood cells and muscular weakness : (A) Vitamin A (B) Vitamin K (C) Vitamin E (D) Vitamin D	1
10.	Which of the following will be the least reactive towards nucleophilic substitution reaction? (A)  (C) CH₃ - Cl (B)  (D) 	1
11.	Alkenes are formed by heating alcohols with conc. H ₂ SO ₄ . The first step in the reaction is : (A) formation of carbocation (B) formation of ester (C) protonation of alcohol molecule (D) elimination of water	1

12.	The IUPAC name for $\text{CH}_3 - \text{CH}_2 - \text{N}(\text{CH}_3) - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ is : (A) N-methylpentan-2-amine (B) N-ethyl-N-methylpropan-1-amine (C) N,N-diethylpropan-1-amine (D) N,N-dimethylpropan-1-amine	1
	For questions number 13 to 16, two statements are given – one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below : (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.	
13.	Assertion (A) : The boiling points of alkyl halides decrease in the order $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$. Reason (R) : The van der Waals forces of attraction decrease in the order $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$.	1
14.	Assertion (A) : Phenol is strongly acidic as compared to ethanol. Reason (R) : Phenoxide ion is less stable than ethoxide ion.	1
15.	Assertion (A) : Butan-2-ol has four different groups attached to the tetrahedral carbon and is chiral. Reason (R) : $(\pm)$ Butan-2-ol is a racemic mixture and does not show any optical activity.	1
16.	Assertion (A) : A mixture of <i>o</i> -nitrophenol and <i>p</i> -nitrophenol can be separated by steam distillation. Reason (R) : <i>o</i> -nitrophenol is steam volatile due to intermolecular hydrogen bonding.	1
SECTION B		
17.	Write the structures of the main products of the following reactions : (a)  (b) 	2
18.	Why are haloarenes less reactive towards nucleophilic substitution reaction? How does the presence of nitro ($-\text{NO}_2$) group at ortho- and para-positions in haloarenes increase the reactivity towards nucleophilic substitution reaction?	2

19.	Predict the products formed when CH_3CHO reacts with the following reagents : (i) CH_3MgBr and then H_3O^+ (ii) Zn(Hg)/Conc. HCl OR Describe the following with suitable chemical equations : (i) Cannizzaro reaction (ii) Hell-Volhard-Zelinsky reaction	2
20.	Arrange the following compounds in the increasing order of their property indicated : (i) Acetaldehyde, Benzaldehyde, Acetophenone, Acetone (Reactivity towards HCN) (ii) $(\text{CH}_3)_2\text{CHCOOH}$, $\text{CH}_3\text{CH}_2\text{CH(Br)COOH}$, $\text{CH}_3\text{CH(Br)CH}_2\text{COOH}$ (Acidic strength)	2
21.	(a) Write a chemical test to distinguish between Dimethyl amine and ethyl amine. (b) Write the product formed when diazonium salt is treated with fluoroboric acid.	2
SECTION C		
22.	(i) Name any two bases which are common to both DNA and RNA. (ii) Define the following (a) Peptide linkage (b) Phosphodiester Linkage.	3
23.	Write the chemical equation for the following : (a) Hydration of propene in presence of an acid. (b) Reaction between Ethyl bromide and $\text{C}_2\text{H}_5\text{ONa}$. (c) Reaction between Dimethyl ether and Hydrogen iodide. OR (a) Can sodium propoxide and t-butyl chloride be used for the preparation of t-butyl propyl ether? Give suitable explanation. Justify your answer by suggesting the appropriate starting material required for the preparation of t-butyl propyl ether. (b) Give the IUPAC name of the above mentioned ether.	3
24.	Calculate emf of the following cell at 298 K : $\text{Mg(s)} \text{Mg}^{2+} (0.001 \text{ M}) \text{Cu}^{2+} (0.0001 \text{ M}) \text{Cu(s)}$ Given : $E^\circ_{\text{cell}} = 2.71 \text{ V}$, $\log 10 = 1$	3
25.	An aqueous solution of NaOH was made and its molar mass from the measurement of osmotic pressure at 25°C was found to be 28 g mol^{-1}. Calculate the percentage dissociation of NaOH in this solution. [Atomic mass : $\text{Na} = 23.0 \text{ u}$, $\text{O} = 16.0 \text{ u}$, $\text{H} = 1.0 \text{ u}$]	3
26.	How can you obtain the following from aniline ? Give only chemical equation. (a) p-nitroaniline (b) Chlorobenzene (c) Phenol	3
27.	Account for the following: (a) Grignard reagent should be prepared under anhydrous conditions.	3

	(b) The dipole moment of chloro benzene is lower than that of cyclohexyl chloride. (c) The melting point of para dichlorobenzene is higher than that of ortho and meta isomers	
28.	Write the equations involved in the following reactions : (a) Stephen reaction (b) Wolff-Kishner reaction (c) Ethanoic acid is heated with P_2O_5 in presence of H_2SO_4	3
SECTION D		
29.	The reaction of amines with mineral acids to form ammonium salts shows that these are basic in nature. Aliphatic amines are stronger bases than ammonia whereas aromatic amines are weaker bases than ammonia. Aliphatic and aromatic primary and secondary amines react with acid chlorides, anhydrides and esters by nucleophilic substitution reaction. The main problem encountered during electrophilic substitution reactions of aromatic amines is that of their high reactivity. Substitution tends to occur at ortho-and para-positions. Hinsberg reagent is used for the identification and distinction between primary, secondary and tertiary amines. Aryldiazonium salts, usually obtained from arylamines, undergo replacement of the diazonium group with a variety of nucleophiles to provide advantageous methods for producing aryl halides, cyanides phenols and arenes.	
a)	a) Arrange the following in the decreasing order of their basic strength $C_6H_5NH_2, C_2H_5NH_2, (C_2H_5)_2NH, NH_3$ b) How will you convert nitrobenzene to aniline?	2
c)	Write structural formulae of the compound A and B : $CH_3CONH_2 \xrightarrow{NaOBr} A \xrightarrow[\text{Base}]{C_6H_5COCl} B$ OR A compound 'X' with molecular formula C_3H_9N reacts with Hinsberg reagent to give a product insoluble in alkali. Identify 'X'.	1
d)	Why is $-NH_2$ group of aniline acetylated before carrying out nitration?	1
30.	Carbohydrates are optically active polyhydroxy aldehydes or ketones or the compounds which produce such units on hydrolysis. They have been broadly classified into three groups — monosaccharides, oligosaccharides and polysaccharides. The carbohydrates may also be classified as either reducing or non-reducing sugars. An important monosaccharide glucose is an aldohexose and is correctly named as D(+)-glucose. It was assigned the open structure on the basis of its reactions with HI, NH_2OH, Br_2 water, $(CH_3CO)_2O$ and nitric acid. Despite having the $-CHO$ group, glucose does not give Schiff's test and hydrogen sulphite addition product with $NaHSO_3$. It was found that glucose forms a six-membered ring in which one of the $-OH$ groups add to the $-CHO$ group and form a cyclic hemiacetal structure.	

	Answer the following questions :	
a)	How do you explain the following? (i) Presence of a carbonyl group in glucose (ii) Presence of five – OH groups in glucose which are attached to different carbon atoms	2
b)	What type of carbohydrates are called reducing sugars?	1
c)	Define the term anomers. OR Glycogen is also known as animal starch. Give reason.	1
SECTION E		
31.	(A) a) Calculate the elevation in boiling point of a solution when 3 g of CaCl_2 (molar mass = 111 g/mol) was dissolved in 260g of water, assuming that CaCl_2 undergoes complete dissociation (K_b for water is 0.52K kg/mol) b) Define Raoult's law. c) On mixing X and Y volume of the resulting solution decreases. What type of deviation from Raoult's law is shown by the resulting solution? d) What change in temperature would you observe after mixing liquid X and Y? OR (B) a) Define Azeotrope. b) What type of azeotrope is formed by negative deviation from Raoult's law? Give an example. c) Scuba divers carry tanks filled with air diluted with helium. Give reason. d) A solution containing 15 g of urea (molar mass = 60 g/mol) per litre of solution in water has the same osmotic pressure (isotonic) as a solution of glucose (molar mass = 180g/mol). Calculate the mass of glucose present in one litre of the solution.	5
32.	(A) a) Two metals 'A' and 'B' have standard electrode potential values of -0.24 V and $+0.80\text{ V}$ respectively. Which of these will liberate hydrogen gas from dil. H_2SO_4? b) Why is the Equilibrium Constant (K_c) related to E°_{cell} and not to E_{cell}? c) What is the use of salt bridge? d) Standard electrode potential for Daniel cell is 1.1V. Calculate the standard Gibbs energy for the reaction: $\text{Zn}_{(s)} + \text{Cu}^{2+}_{(aq)} \rightarrow \text{Zn}^{2+}_{(aq)} + \text{Cu}_{(s)}$	5

	OR (B) a) Calculate the potential for half-cell containing 0.01 M $\text{K}_2\text{Cr}_2\text{O}_7$ (aq), 0.01 M Cr^{3+} (aq) and 1.0×10^{-4} M H^+ (aq). The cell reaction is: $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 14\text{H}^+(\text{aq}) + 6\text{e}^- \longrightarrow 2\text{Cr}^{3+}(\text{aq}) + 7\text{H}_2\text{O}(\text{l})$ The standard electrode potential $E^\circ_{\text{cell}} = 1.33$ V. (given $\log 10 = 1$) b) In the experimental determination of electrolytic conductance, direct current (DC) is not used. Why? c) Predict the following reaction is spontaneous or not at 25°C. $\text{Au}(\text{s}) + \text{Ca}^{2+}(1\text{M}) \rightarrow \text{Au}^{3+}(1\text{M}) + \text{Ca}(\text{s})$ $E^\circ_{\text{Au}^{3+}/\text{Au}} = +1.5 \text{ V}, E^\circ_{\text{Ca}^{2+}/\text{Ca}} = -2.87 \text{ V}$	
33.	(A) a) Carry out the following conversions: - Ethanal to but-2-enal - Propanoic acid to ethane. b) An alkene 'A' with molecular formula C_5H_{10} on Ozonolysis gives a mixture of two compounds 'B' and 'C'. Compound 'B' gives positive Fehling test and also reacts with iodine and NaOH solution. Compound 'C' does not give Fehling solution test but forms iodoform. Identify the compound A, B and C OR (B) a) Write the structures of A, B, C, D and E in the following reactions: $\text{C}_6\text{H}_6 \xrightarrow[\text{Anhyd. AlCl}_3]{\text{CH}_3\text{COCl}} \text{A} \xrightarrow{\text{NaOI}} \text{D} + \text{E}$ $\text{A} \xrightarrow{\text{Zn-Hg/conc. HCl}} \text{B} \xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) KMnO}_4 - \text{KOH}, \Delta} \text{C}$ b) Write the structure of 2,4-Dinitro phenyl hydrazone of ethanal. c) Ethanoic acid is stronger acid than ethanol. Give reason. d) Why do carboxylic acids not give reactions of carbonyl group?	5
