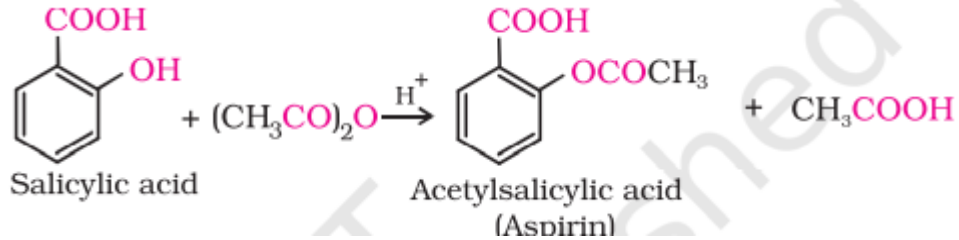
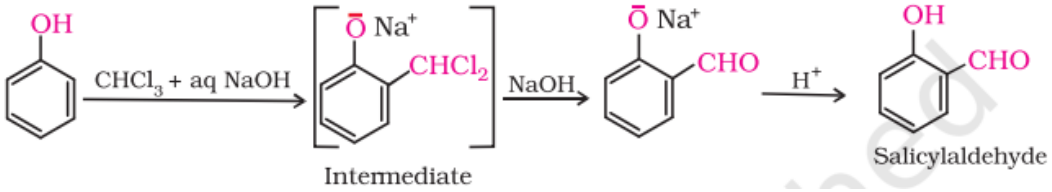
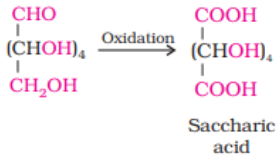
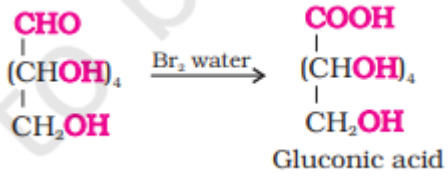
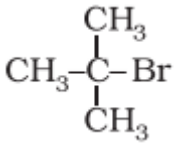
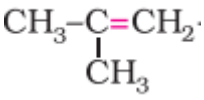
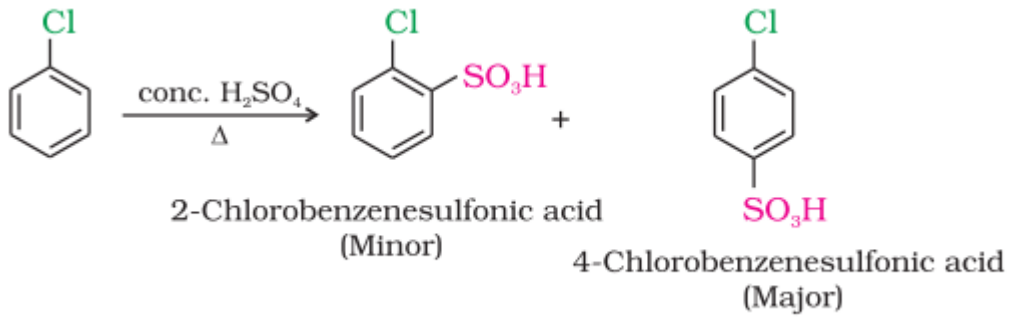
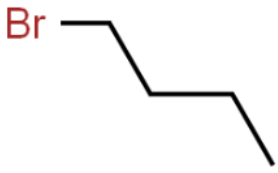
INDIAN SCHOOL AL WADI AL KABIR
ASSESSMENT I-2022-2023
CHEMISTRY (043)- ANSWER KEY

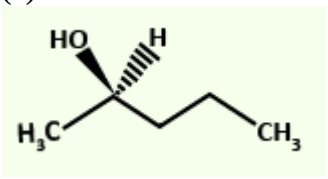
Q.No	Answer	Marks
1	(b) CH_3CHBr_2	1
2	(c) $CH_3CH(OH)CH_3$	1
3	(d) dextrorotatory; laevorotatory	1
4	(b) hypertonic solution	1
5	(a) (n-1) d^{1-10} ns^{1-2}	1
6	(c) Finkelstein reaction	1
7	(b) Secondary alcohol	1
8	(b) ribose sugar and uracil	1
9	(b) depression in freezing point of snow	1
10	(d) isomers of glucose that differ in configuration at carbon one (C-l)	1
11	(b) Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of Assertion(A).	1
12	(c) Assertion (A) is correct but Reason (R) is incorrect statement.	1
13	(a) Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of Assertion(A)	1
14	(a) Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of Assertion(A)	1
15	(d) Assertion (A) is incorrect but Reason (R) is correct statement	1
16	Any optically active amino acid	1
17	The main forces which stabilise the 2° and 3° structures of proteins are hydrogen bonds, disulphide linkages, van der Waals and electrostatic forces of attraction.	½ ×2
18	When the polypeptide chains run parallel and are held together by hydrogen and disulphide bonds, then fibre– like structure is formed. Such proteins are generally insoluble in water Keratin/Myosin etc	½ ×2
19	When a protein in its native form, is subjected to physical change like change in temperature or chemical change like change in pH, the hydrogen bonds are disturbed. Due to this, globules unfold and helix get uncoiled and protein loses its biological activity. This is called denaturation of proteins	1
20	Those amino acids which cannot be synthesised in the body and must be obtained through diet, are known as essential amino acids. Any suitable example	½ ×2
21	Reagent 1- aq KOH Reagent 2- alc KOH, heat	1 ×2
22	(a)	1

	 (b) 	1
23	(a) due to the repulsive interaction between the two bulky (–R) groups. (b) due non-polar hydrocarbon part	1 1
24	(a)  (b) 	1 1
25	(a) If a pressure larger than the osmotic pressure is applied to the solution side, the pure solvent flows out of the solution through the semi permeable membrane. This phenomenon is called reverse osmosis (b) Desalination of sea water	1 1
26	(a) [Ar] $4s^1 3d^5$ (b) [Ar] $4s^2 3d^2$	1 1
27	Any two and their diseases OR 1. Despite having the aldehyde group, glucose does not give Schiff's test and it does not form the hydrogensulphite addition product with $NaHSO_3$. 2. The pentaacetate of glucose does not react with hydroxylamine indicating the absence of free —CHO group. 3. Glucose is found to exist in two different crystalline forms which are named as α and β. The α-form of glucose (m.p. 419 K) is obtained by crystallisation from concentrated solution of glucose at 303 K while the β-form (m.p. 423 K) is obtained by crystallisation from hot and saturated aqueous solution at 371 K.	½ ×4 1 ×2
28	(a) 1-Bromobut-2-ene (b) i. Any two reasons ii. Chloroform is slowly oxidised by air in the presence of light to an extremely poisonous gas, carbonyl chloride, also known as phosgene.	1 ½ ×2 1

	$2CHCl_3 + O_2 \xrightarrow{\text{light}} 2COCl_2 + 2HCl$ Phosgene	
29	Mass of acetic acid, w_1= 75 g Molar mass of ascorbic acid ($C_6H_8O_6$), M_2= 6 × 12 + 8 × 1 + 6 × 16 = 176 g mol $^{-1}$ Lowering of melting point, ΔT_f = 1.5 K We know that: $\Delta T_b = \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$ $\Rightarrow w_2 = \frac{\Delta T_b \times M_2 \times w_1}{K_b \times 1000}$ = (1.5 x 176 x 75) / (3.9 x 1000) = 5.08 g (approx) Hence, 5.08 g of ascorbic acid is needed to be dissolved.	½ ½ ½ ½ 1
30	(i) $CH_3-CH_2-\ddot{O}-H + H^+ \longrightarrow CH_3-CH_2-\overset{+}{\ddot{O}}-H$ (ii) $CH_3CH_2-\ddot{O}: + CH_3-CH_2-\overset{+}{O}(H)(H) \rightarrow CH_3CH_2-\overset{+}{O}(H)-CH_2CH_3 + H_2O$ (iii) $CH_3CH_2-\overset{+}{O}(H)-CH_2CH_3 \longrightarrow CH_3CH_2-O-CH_2CH_3 + H^+$	1 1 1
31	(a) n-Butane < ethoxyethane < pentan-1-ol.	1

	(b) Propan-1-ol < 4-Methylphenol < Phenol < 2,4,6-Trinitrophenol (c) Ethanol < Propan-2-ol < 2-Methylpropan-2-ol OR X  Y  Z 2-Iodo-2-methylpropane	1 1 1 1 1
32	(a) readily excreted in urine and cannot be stored (except vitamin B12) in our body (b) β-D-Galactose and β-D-Glucose (c) Phosphodiester linkage	1 ½ ½ 1
33	(a) $BrCH_2-CH_2Br$ (b) $CH_3CH(NO_2)CH_2CH_3$ (c)  2-Chlorobenzenesulfonic acid (Minor) 4-Chlorobenzenesulfonic acid (Major)	1 1 ½, ½
34	(a) for a solution of volatile liquids, the partial vapour pressure of each component of the solution is directly proportional to its mole fraction present in solution (b) Any two points	1 1×2
35	(a) ii -primary alkyl halide explanation  (b) ii. CH_3Cl Polarity, molecular mass, dipole interactions- CH_3Cl	1 1

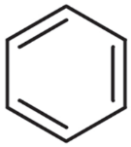
(c) i.



chiral

1

(d) i



the halogen atom because of its –I effect has some tendency to withdraw electrons from the benzene ring. As a result, the ring gets somewhat deactivated as compared to benzene and hence the electrophilic substitution reactions in haloarenes occur slowly. 1

(e)

ii. $CHCl_3$

density increases with increase in number of halogen atoms

1

OR

(a) Neopentane

(b) Lucas test expln 1

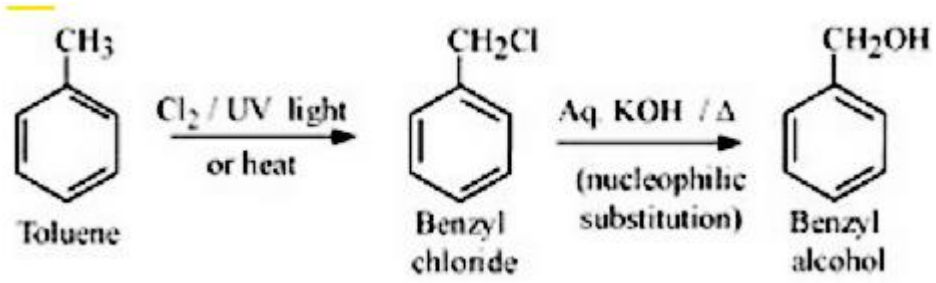
(c) In the Grignard reagent, the carbon-magnesium bond is covalent but highly polar, with 1
carbon pulling electrons from electropositive magnesium; the magnesium halogen bond is 1
essentially ionic.

(d) i.

$$2CH_3CH_2CH_2CH_2Cl + 2Na \xrightarrow[\text{Wurtz reaction}]{\text{Dry ether}} \underset{(n-\text{octane})}{CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3} + 2NaCl$$

1

ii.



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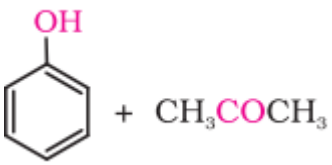
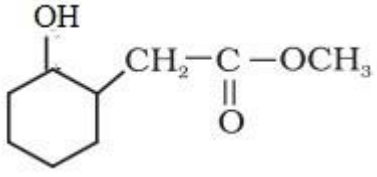
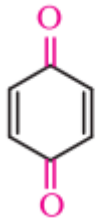
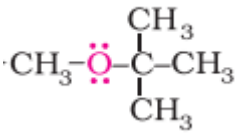
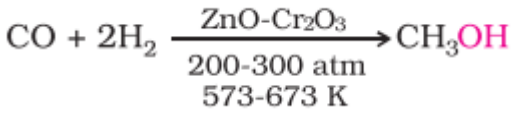
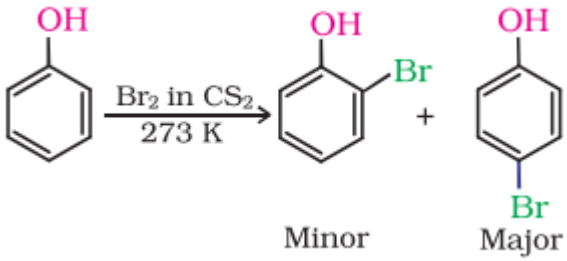
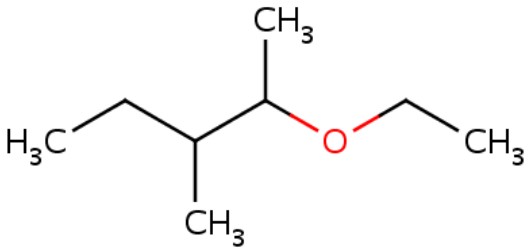
36	(a)  (b) 	1 1

	(c)  (d) Phenol $+C_2H_5Br$ (e)  + NaBr OR (a) i. The commercial alcohol is made unfit for drinking by mixing in it some copper sulphate (to give it a colour) and pyridine (a foul-smelling liquid). It is known as denaturation of alcohol. ii.  (b) i.  ii.  (c) 	1 1 1 1 1 1 1
37	(a) i. $\text{Molality (m)} = \frac{\text{Moles of solute}}{\text{Mass of solvent in kg}}$	1

	ii. Depression in freezing point of a 1 molal solution. Kf – kkgmol^{-1} iii. People taking a lot of salt or salty food experience water retention in tissue cells and intercellular spaces because of osmosis. The resulting puffiness or swelling is called edema. (b) Given, that mass of NaOH $w_2=40 \times 10^{-3}$kg Volume V=2 L T=25+273 =298 K Number of ions produced=2=i Hence, π=iCRT $\pi=2\times\times40 \times 10^{-3} \times 0.083\times298/ 40 \times 2L$ = 24.734 bar	1 1 ½ ½ ½ ½
37	OR (a) negative deviations from Raoult's law The intermolecular attractive forces between A-A and B-B are weaker than those between A-B and leads to decrease in vapour pressure resulting in negative deviations. In this case the intermolecular hydrogen bonding between phenolic proton and lone pair on nitrogen atom of aniline is stronger than the respective intermolecular hydrogen bonding between similar molecules. (b) Mole fraction Molar mass of glucose ($C_6H_{12}O_6$) = $6 \times 12 + 12 \times 1 + 6 \times 16$ = 180gmol^{-1} Number of moles = $\frac{\text{Given mass in grams}}{\text{Molecular mass}}$ Number of moles of glucose = $\frac{10}{180}$mol = 0.056 mol Number of moles of water = $\frac{90\text{ g}}{18\text{ gmol}^{-1}}$ = 5 mol Mole fraction = $\frac{\text{Number of moles of solute}}{\text{Number of moles of solute + number of moles of solvent}}$ Mole fraction of glucose, x_g = $\frac{0.056}{0.056+5}$ = 0.011 Mole fraction of water, x_w = $1 - x_g$ = 1 − 0.011 = 0.989 Molarity = Mass% × density × 10/ Molar mass of solute = 10 × 1.2 × 10/ 180 = 0.67 M	1 ½ ½ ½ ½ ½ ½ ½