Series : WYXZ5

SET ~ 1

रोल नं.
Roll No.

प्रश्न-पत्र कोड
Q.P. Code 56/5/1

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।
Candidates must write the Q.P. Code on the title page of the answer-book.

(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **23** हैं।
Please check that this question paper contains **23** printed pages.

(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।
Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में **33** प्रश्न हैं।
Please check that this question paper contains **33** questions.

(IV) **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।**
Please write down the Serial Number of the question in the answer-book at the given place before attempting it.

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.
#

रसायन विज्ञान (सैद्धान्तिक)
CHEMISTRY (Theory)

निर्धारित समय : ***3*** *घण्टे*
Time allowed : ***3*** *hours*

अधिकतम अंक : ***70***
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) *Kindly note that there is a separate question paper for Visually Impaired candidates.*

(x) *Use of calculator is **not** allowed.*

SECTION A

*Questions no. **1** to **16** are Multiple Choice type Questions, carrying **1** mark each.* *16×1=16*

1. The role of a catalyst is to change :

(A) equilibrium constant

(B) enthalpy of reaction

(C) Gibbs energy of reaction

(D) activation energy of reaction

2. Which of the following molecules is chiral in nature ?

(A) 1-chloropropane (B) 2-chloropropane

(C) 1-chlorobutane (D) 2-chlorobutane

3. CH_3CH_2OH can be converted to CH_3CHO by :

(A) catalytic hydrogenation

(B) treatment with $LiAlH_4$

(C) treatment with PCC

(D) treatment with $KMnO_4$

4. The IUPAC name for $CH_3 - CH_2 - N(CH_3) - CH_2 - CH_2 - CH_3$ is :

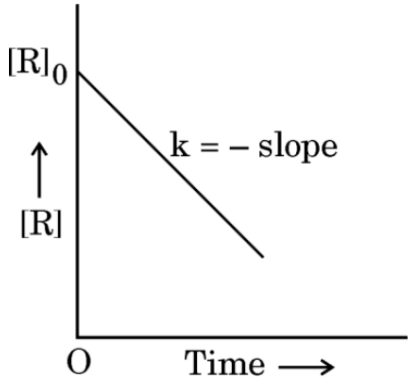
(A) N-methylpentan-2-amine

(B) N-ethyl-N-methylpropan-1-amine

(C) N,N-diethylpropan-1-amine

(D) N,N-dimethylpropan-1-amine

5. A plot between concentration of reactant [R] and time 't' is shown below. Which of the given order of reaction is indicated by the graph ?



(A) Third order

(B) Second order

(C) First order

(D) Zero order

6. The treatment of ethyl bromide with alcoholic silver nitrite gives :

(A) ethyl nitrite

(B) nitroethane

(C) nitromethane

(D) ethene

7. Which of the following aqueous solutions will have the highest freezing point ?

(A) 1·0 M KCl

(B) 1·0 M Na_2SO_4

(C) 1·0 M Glucose

(D) 1·0 M $AlCl_3$

8. Which of the following aldehydes will undergo Cannizzaro reaction ?

(A) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CHO$

(B) $(CH_3)_3C\ CHO$

(C) $CH_3 - CH_2 - CHO$

(D) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CHO$

9. In which of the following groups are both ions coloured in aqueous solution ?

I. Cu^+ II. Ti^{4+} III. Co^{2+} IV. Fe^{2+}

[Atomic number : Cu = 29, Ti = 22, Co = 27, Fe = 26]

(A) I and II (B) II and III

(C) III and IV (D) I and IV

10. CH_3CH_2CHO and CH_3CH_2COOH can be distinguished by :

(A) Sodium bicarbonate test

(B) Hinsberg test

(C) Iodoform test

(D) Lucas test

11. Match the type of cell given in Column I with their use given in Column II.

	Column I		*Column II*
i.	Lead storage cell	a.	Wall clock
ii.	Mercury cell	b.	Apollo Space Programme
iii.	Dry cell	c.	Wrist watch
iv.	Fuel cell	d.	Inverter

(A) i-a, ii-b, iii-c, iv-d (B) i-d, ii-c, iii-a, iv-b

(C) i-c, ii-d, iii-b, iv-a (D) i-b, ii-a, iii-d, iv-c

12. While doing qualitative analysis in chemistry lab, Abhishek added yellow coloured potassium chromate solution into a test tube. He was surprised to see the colour of the solution changing immediately to orange. He realised that the test tube was not clean and contained a few drops of some liquid. Which of the following substances will be the most likely liquid to be present in the test tube before adding potassium chromate solution ?

(A) Sodium hydrogen carbonate solution

(B) Methyl orange solution

(C) Sodium hydroxide solution

(D) HCl solution

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) :* For measuring resistance of an ionic solution an AC source is used.

Reason (R) : Concentration of ionic solution will change if DC source is used.

14. *Assertion (A) :* Henry's law constant (K_H) decreases with increase in temperature.

Reason (R) : As the temperature increases, solubility of gases in liquids decreases.

15. *Assertion (A) :* The solubility of aldehydes and ketones in water decreases with increase in size of the alkyl group.

Reason (R) : Aldehydes and ketones have dipole-dipole interaction.

16. *Assertion (A) :* The boiling points of alkyl halides decrease in the order RI > RBr > RCl > RF.

Reason (R) : The van der Waals forces of attraction decrease in the order RI > RBr > RCl > RF.

SECTION B

17. (a) Calculate the elevation of boiling point of a solution when 3 g of $CaCl_2$ (Molar mass = 111 g mol^{-1}) was dissolved in 260 g of water, assuming that $CaCl_2$ undergoes complete dissociation. (K_b for water = 0·52 K kg mol^{-1}) *2*

OR

(b) Liquids 'X' and 'Y' form an ideal solution. The vapour pressure of pure 'X' and pure 'Y' are 120 mm Hg and 160 mm Hg respectively. Calculate the vapour pressure of the solution containing equal moles of 'X' and 'Y'. *2*

18.

Concentration of KCl solution in mol / L	*Conductivity at 298·15 K in S cm^{-1}*	*Molar Conductivity at 298·15 K in S cm^2 mol^{-1}*
1·000	0·1113	111·3
0·100	0·0129	129·0
0·010	0·00141	141·0

Based on the data given above, give plausible reason for the variation of conductivity and molar conductivity with concentration. *2*

19. (a) Write the rate law expression for the reaction $2HI \rightarrow H_2 + I_2$, if the order of the reaction is zero. *1*

(b) What is the effect of temperature on the rate of reaction ? Write a mathematical expression for the same. *1*

20. Explain the mechanism of acid catalysed hydration of ethene. *2*

21. (a) How can acetaldehyde be prepared from acetyl chloride ? *1*

(b) Propanal is more reactive than propanone towards nucleophilic addition reaction. Give reason. *1*

SECTION C

22. (a) Shweta mixed two liquids A and B of 10 mL each. After mixing, the volume of the solution was found to be 20·2 mL.

(i) Why was there a volume change after mixing the liquids ? *1*

(ii) Will there be an increase or decrease of temperature after mixing ? *1*

(iii) Give one example for this type of solution. *1*

OR

(b) (i) How does sprinkling of salt help in clearing the snow covered roads in hilly areas ? *1*

(ii) What happens when red blood cells are kept in 0·5% (mass/vol) NaCl solution ? Justify your answer. *1*

(iii) Write an application of reverse osmosis. *1*

23. For the reaction A + B $\rightarrow$ Products, the following initial rates were obtained at various initial concentrations of reactants :

Sl. No.	*[A]/mol* L^{-1}	*[B]/mol* L^{-1}	*Initial rate/mol* L^{-1} s^{-1}
1	0·1	0·1	0·05
2	0·2	0·1	0·10
3	0·1	0·2	0·05

Determine the order of the reaction with respect to A and B and overall order of the reaction. *3*

24. (a) What is meant by crystal field splitting energy ? For a d^4 ion, write the configuration if (i) $\Delta_o < P$, and (ii) $\Delta_o > P$.

(b) Explain why in tetrahedral coordination entities, low spin configurations are rarely observed. *3*

25. Account for the following :

(a) The C – Cl bond length in chlorobenzene is shorter than that in methyl chloride. *1*

(b) Grignard reagents should be prepared under anhydrous conditions. *1*

(c) In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation. *1*

26. (a) Arrange the following compounds in the increasing order of their acidic strength : *1*

3,5-dinitrophenol, 4-methylphenol, phenol, 2,4,6-trinitrophenol

(b) What happens when : (write equations) *2*

(i) Phenol is distilled with Zn dust ?

(ii) Anisole is treated with HBr ?

27. An organic compound 'A' (molecular formula C_8H_8O) gives 2,4-DNP test. It does not give Tollen's test, but gives a yellow precipitate 'B' with NaOH and I_2. On drastic oxidation, it gives a carboxylic acid 'C' with formula $C_7H_6O_2$. Identify 'A', 'B', 'C' and write the reactions involved. *3*

28. (a) Name the type of linkage responsible for the formation of proteins from α-amino acids. *1*

(b) Write any two differences between DNA and RNA. *2*

SECTION D

The following questions are case-based questions. Read the case carefully and answer the questions that follow.

29. Carbohydrates are polyhydroxy aldehydes or ketones that represent enormous structural diversity in terms of the arrangement of atoms in space, resulting in hundreds of stereoisomers. Although the chemical properties of most stereoisomers may not be very different, their metabolic rate and utilization in biological systems is significantly different and known to influence the overall carbohydrate metabolism. Structural variants, which arise due to a different arrangement of atoms in three-dimensional space are known as stereoisomers. The number of stereoisomers can be theoretically estimated by using the formula 2n, where 'n' is the number of stereocenters or asymmetric (chiral) carbon atoms in a molecule. Out of these stereoisomers, there are some structures, which are mirror images of each other, and they are referred to as enantiomers.

Answer the following questions :

(a) Give chemical reactions to show the presence of an aldehydic group and straight chain in glucose. *2*

(b) (i) Define anomers. *1*

OR

(b) (ii) Draw the structure of β-D-Glucopyranose. *1*

(c) Sucrose is known as invert sugar. Explain. *1*

30. Werner's coordination theory in 1893 was the first attempt to explain the bonding in coordination complexes. It must be remembered that this theory was put forward before the electron had been discovered by J.J. Thomson in 1897, and before the electronic theory of valency. Werner did not have any of the modern instrumental techniques and all his studies were made using simple experimental techniques. Werner was able to explain the nature of bonding in complexes and he concluded that in complexes, the metal shows two different sorts of valency : primary and secondary. Primary valences are normally ionisable whereas secondary valences are non ionisable.

Answer the following questions :

(a) One mole of $CrCl_3 \cdot 4H_2O$ precipitates one mole of AgCl when treated with excess of $AgNO_3$ solution. Write (i) the structural formula of the complex, and (ii) the secondary valency of Cr. *2*

(b) What is the difference between a complex and a double salt ? *1*

(c) (i) Arrange the following complexes in the increasing order of conductivity of their solution : *1*

$[Cr(NH_3)_3Cl_3]$, $[Cr(NH_3)_6]Cl_3$, $[Cr(NH_3)_5Cl]Cl_2$

OR

(c) (ii) Write two differences between primary and secondary valences in coordination compounds. *1*

SECTION E

31. (a) (i) For a galvanic cell, the following half reactions are given. Decide, which will remain as reduction reaction and which will be reversed to become an oxidation reaction. Give reason for your answer. *2*

(I) $Cr^{3+} + 3e^- \rightarrow Cr(s)$; $E^\circ = -0{\cdot}74$ V

(II) $Fe^{2+} + 2e^- \rightarrow Fe(s)$; $E^\circ = -0{\cdot}44$ V

(ii) Represent the cell in which the following reaction takes place : *3*

$Mg(s) + 2Ag^+ (0{\cdot}001\ M) \rightarrow Mg^{2+} (0{\cdot}100\ M) + 2Ag(s)$

Calculate E_{cell} if $E^\circ_{cell} = 3{\cdot}17$ V. (log 10 = 1)

OR

(b) (i) State Kohlrausch's law. Give any two applications of it. *2*

(ii) $\wedge^\circ_m NH_4Cl$, $\wedge^\circ_m NaOH$ and $\wedge^\circ_m NaCl$ are 129·8, 217·4, and 108·9 S cm^2 mol^{-1} respectively. Molar conductivity of 1×10^{-2} M solution of NH_4OH is 9·33 S cm^2 mol^{-1}. Calculate the degree of dissociation (α) of NH_4OH solution at this concentration. *3*

32. (a) (i) In a chemistry practical class, the teacher gave his students an amine 'X' having molecular formula C_2H_7N, and asked the students to identify the type of amine. One of the students, Neeta, observed that it reacts with $C_6H_5SO_2Cl$, to give a compound which dissolves in NaOH solution. Can you help Neeta to identify the compound 'X' ? *1*

(ii) Arrange the following in the increasing order of their pK_b value in aqueous phase : *1*

$C_6H_5NH_2$, $(CH_3)_2NH$, NH_3, CH_3NH_2, $(CH_3)_3N$

(iii) Aniline on nitration gives considerable amount of meta product along with ortho and para products. Why ? *1*

(iv) Convert aniline to : *2*

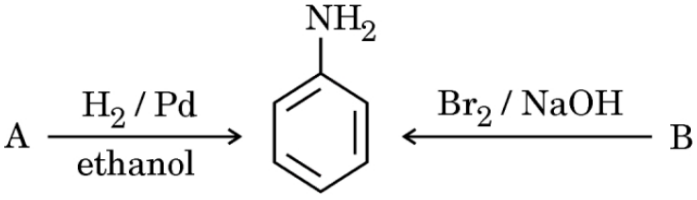
(I) p-bromoaniline

(II) phenol

OR

(b) (i) Arun heated a mixture of ethylamine and $CHCl_3$ with ethanolic KOH, which forms a foul smelling gas. Write the chemical equation involved. *1*

(ii) Identify A and B in the following reactions : *2*



(iii) Convert aniline to : *2*

(I) benzene

(II) sulphanilic acid

33. (a) (i) When pyrolusite ore is fused with KOH, in presence of air, a dark green coloured product 'A' is obtained which changes to purple coloured compound 'B' in acidic medium.

(I) Write the formulae of 'A' and 'B'.

(II) Write the ionic equation for the reaction when compound 'B' reacts with Fe^{2+} in acidic medium. *2*

(ii) Give reasons : *3*

(I) Ce^{4+} in aqueous solution is a good oxidising agent.

(II) The actinoid contraction is greater from element to element than lanthanoid contraction.

(III) $E^{\circ}_{Zn^{2+}/Zn}$ value is more negative than expected, whereas $E^{\circ}_{Cu^{2+}/Cu}$ is positive.

OR

(b) (i) While studying the periodic properties, Arti came across an abnormal behaviour in the atomic size of Hf. She found that, even though Hf is placed below Zr in the same group, both have almost similar atomic sizes.

(I) Which phenomenon is responsible for the above behaviour ? Define it.

(II) Mention any other consequence of the above phenomenon. *2*

(ii) Give reasons for the following : *3*

(I) Transition metals exhibit catalytic properties.

(II) Transition metals have high enthalpy of atomisation.

(III) Sc is a transition element, while Zn is not.

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024-25
SUBJECT NAME **CHEMISTRY (Theory) -043**
(Q.P.CODE 56/5/1) MM: 70

General Instructions: -

You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.

"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under various rules of the Board and IPC."

Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**

The Marking scheme carries only suggested value points for the answers

These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.

The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after delibration and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.

Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**

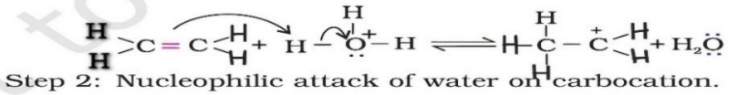
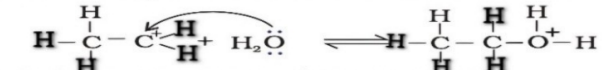
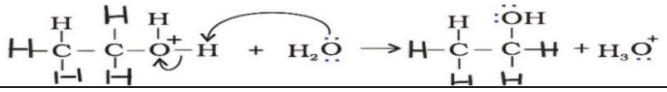
If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.

Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

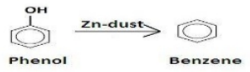
MARKING SCHEME 2024-25
CHEMISTRY(Theory)-043

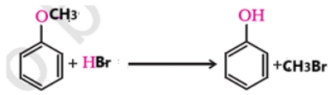
QP Code 56/5/1 **MM: 70**

Q.No	Value Points	Mark
	SECTION A	
1	(D)	1
2	(D)	1
3	(C)	1
4	(B)	1
5	(D)	1
6	(B)	1
7	(C)	1
8	(B)	1
9	(C)	1
10	(A)	1
11	(B)	1
12	(D)	1
13	(A)	1
14	(D)	1
15	(B)	1
16	(A)	1
	SECTI(ON B	
17	$\Delta T_b = iK_b\, m$ $\Delta T_b = i \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$ i=3 $\Delta T_b = \frac{3 \times 0{\cdot}52 \times 3 \times 1000}{111 \times 260}$ =0.162K	½ ½ ½ ½
	OR	
17	Given $n_X = n_Y$ $\chi_X = \chi_Y = 0.5$ $P_T = p_X^0 x_X + p_Y^0 x_Y$ / $p_{total} = x_1 p_1^0 + x_2 p_2^0$ = 120 x 0.5 +160 x 0.5 =60 +80 =140mm Hg	½ 1 ½
18	Conductivity decreases with decrease in concentration Due to decrease in number of current carrying ions per unit volume. Molar conductivity increases with decrease in concentration Due to decrease in inter-ionic attraction or increase in dissociation or increase in number of ions.	½ ½ ½ ½
19	(a) Rate=$k[HI]^0 = k$ (b) Increases with increase in temperature $k = A\, e^{-Ea/RT}$ / $\ln k = \ln A - Ea/RT$	1 ½ ½

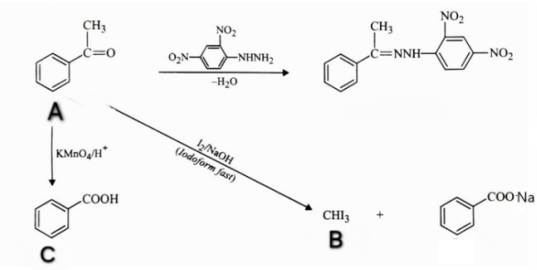
20	The mechanism of the reaction involves the following three steps: Step 1: Protonation of alkene to form carbocation by electrophilic attack of H_3O^+. $H_2O + H^+ \rightarrow H_3O^+$  Step 2: Nucleophilic attack of water on carbocation.  Step 3: Deprotonation to form an alcohol. 	½ ½ 1
21	(a)Acetyl chloride is hydrogenated over catalyst, palladium-barium sulphate to prepare acetaldehyde / $CH_3COCl \xrightarrow[Pd-BaSO_4]{H_2} CH_3CHO$ (b)Due to less steric hinderance and greater electrophilicity of carbonyl carbon in propanal than propanone. / Due to more steric hinderance and less electrophilicity of carbonyl carbon in propanone than propanal	1 1
	SECTION C	
22	(a) (i) The solution is non ideal, shows positive deviation from Raoult's law / A-B interactions are weaker than A-A and B-B interactions (ii)Decrease in temperature (iii) Ethanol and acetone (or any other suitable example)	1 1 1
	OR	
22	(b) (i)Salt lowers the freezing point of water and prevents formation of ice and hence its easy to clean. (ii)-Red blood cells swell up -As the solution is hypotonic, water will flow into the cell/ As the solution is hypotonic, endosmosis occurs. (iii) Desalination of sea water	1 ½ ½ 1
23	Rate=$k[A]^x[B]^y$ Eq.1 $Rate_1=k(0.1)^x(0.1)^y=5.0 \times 10^{-2}$ Eq.2 $Rate_2=k(0.2)^x(0.1)^y=1.0 \times 10^{-1}$ Eq.3 $Rate_3=k(0.1)^x(0.2)^y=5.0 \times 10^{-2}$ $\frac{0.1}{0.5} = \frac{k \times 0.2^x \times 0.1^y}{k \times 0.1^x \times 0.1^y}$ Hence x=1 $\frac{0.05}{0.05} = \frac{k \times 0.1^x \times 0.2^y}{k \times 0.1^x \times 0.1^y}$ Hence y= 0 Rate=$k[A]^1[B]^0$ Overall order=1	1 1 1
24	(a)The difference of energy between the two sets of d-orbitals t_{2g} and eg due to the presence of ligands in a definite geometry. / The energy required to split the degenerate d-orbitals into two sets of orbitals. (i) $\mathbf{t^3_{2g}e^1_g}$ (ii) $\mathbf{t^4_{2g}e^0_g}$ (b)Orbital splitting energy is not sufficiently large for causing pairing of electrons	1 ½ ½ 1

<table>
<tr><td>25</td><td>(a)Due to resonance in chlorobenzene leading to partial double bond character of C-Cl bond but there is no resonance in CH_3Cl / sp^2 hybridised carbon atom having shorter bond length between C-Cl in chlorobenzene than sp^3 hybridized carbon in methyl chloride.
(b)Grignard reagent react with water to form corresponding hydrocarbon
(c)Due to the formation of planar carbocation, nucleophile may attack from either side of carbocation.</td><td>1

1
1</td></tr>
<tr><td>26</td><td>(a) 4-methylphenol < Phenol < 3,5-dinitrophenol < 2,4,6-trinitrophenol
(b)
(i)
 

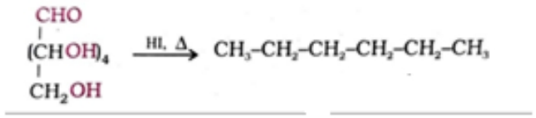
(ii)
 
</td><td>1

1

1</td></tr>
<tr><td>27</td><td>A=Acetophenone/$C_6H_5COCH_3$
B= Iodoform/CHI_3,
C=Benzoic acid/C_6H_5COOH
 
</td><td>½
½
½

½ x 3</td></tr>
<tr><td>28</td><td>(a) Peptide linkage
(b)<table><tr><th>DNA</th><th>RNA</th></tr><tr><td>Double stranded</td><td>Single stranded</td></tr><tr><td>Sugar is deoxyribose</td><td>Sugar is ribose</td></tr><tr><td>Thymine base is present</td><td>Uracil base is present</td></tr><tr><td>It replicates</td><td>It does not replicate</td></tr></table>(or any two suitable differences)</td><td>1

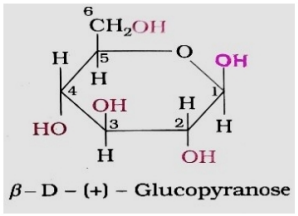
1+1</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>29</td><td>(a)
 

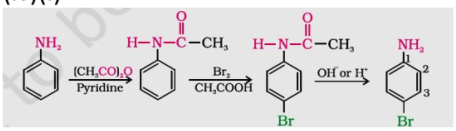
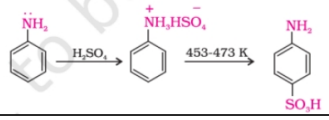
 

(b)(i)Cyclic structures of glucose differ only in configuration of -OH group at C_1. / Stereoisomers which differ in configuration of -OH group at C_1 or C_2
OR</td><td>1

1

1</td></tr>
</table>

	(b)(ii)  β – D – (+) – Glucopyranose	1
	(c)Hydrolysis of dextrorotatory sucrose brings a change in the sign of rotation or inverts the optical rotation from dextro to laevo. The product of hydrolysis is invert sugar.	1
30	(a) (i) $[Cr(H_2O)_4Cl_2]Cl$ (ii) 6 (b) Double salts dissociate into simple ions while complex compounds do not dissociate completely into ions when dissolved in water. (Or any other suitable difference) (c) (i) $[Cr(NH_3)_3Cl_3]$ < $[Cr(NH_3)_5Cl]Cl_2$ < $[Cr(NH_3)_6]Cl_3$ **OR** (c)(ii)	1 1 1 1
	Primary Valency / Secondary Valency 1.Ionisable / 1. Non-ionisable 2.Satisfied by negative ions / 2. Satisfied by negative ions or neutral molecules (or any other two suitable differences)	½+½
	SECTION E	
31	(a) (i) **(II)** will remain as reduction reaction / (II) (I) will be reversed to become an oxidation reaction Due to low reduction potential of Cr (ii) Cell representation $Mg(s)/Mg^{2+}(aq,0.100M)\|\|Ag^{+}(aq,0.001M)/Ag(s)$ n=2 $Ecell = E°cell - \frac{2.303RT}{nF}\log\frac{[Mg^{2+}]}{[Ag^{+}]^2}$ $= 3.17 - \frac{0.059}{2}\log\frac{0.100}{(0.001)^2}$ $= 3.17 - \frac{0.059}{2}\log 10^5$ $= 3.17 - 0.0295 \times 5$ $= 3.17 - 0.1475$ $= 3.0225$ V or 3.02 V	½ ½ 1 1 ½ 1 ½
	OR	
31	(b)(i)Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. To determine -1. Limiting molar conductivity of an electrolyte. 2.Dissociation constant of a weak electrolyte (or any other two suitable applications) (ii)$\Lambda°mNH_4OH = \Lambda°mNH_4Cl + \Lambda°mNaOH - \Lambda°mNaCl$ $= 129.8 + 217.4 - 108.9$ $=238.3\ Scm^2mol^{-1}$ $\alpha = \frac{\Lambda m^c}{\Lambda°m}$	1 ½ ½ ½ 1 ½

	$= \frac{9.33}{238.3}$ =0.039 /3.9%	1
32	(a)(i) Amine 'X' react with $C_6H_5SO_2Cl$ to give a compound ,soluble in NaOH so amine 'X' is primary amine, $CH_3CH_2NH_2$/Ethanamine/Ethyl amine (ii) $(CH_3)_2NH < CH_3NH_2 < (CH_3)_3N < NH_3 < C_6H_5NH_2$ (iii) In the strongly acidic medium, aniline is protonated to anilinium ion, which is meta-directing. (iv)(I)  (II) $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0\text{-}5°C)} C_6H_5N_2^+Cl^- \xrightarrow{H_2O,\ 283K} C_6H_5OH$	½ +½ 1 1 1 1
	OR	
32	(b)(i) $CH_3CH_2NH_2 + CHCl_3 + 3KOH(EtOH) \xrightarrow{\Delta} C_2H_5NC + 3KCl + 3H_2O$ (ii)A =  B =  (iii) (I) $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0\text{-}5°C)} C_6H_5N_2^+Cl^- \xrightarrow{CH_3CH_2OH} C_6H_6$ (II) 	1 1 1 1 1
33	(a)(i) (I) A - K_2MnO_4 B- $KMnO_4$ (II) $MnO_4^- + 5Fe^{2+} + 8H^+ \longrightarrow Mn^{2+} + 5\ Fe^{3+} + 4H_2O$ (ii) (I) Gets reduced to +3 common oxidation state. (II) Due to poorer shielding offered by 5f electrons than 4f. (III) Due to completely filled d- subshell (d^{10}) in zinc whereas in Cu, due to high enthalpy of atomization and low enthalpy of hydration.	½ +½ 1 1 1 1
	OR	
33	(b)(i) (I) Lanthanoid contraction. The steady decrease in atomic and ionic radii in lanthanoid series. (II) Decrease in basic character from left to right in lanthanoid series. (any other correct consequence)	½ ½ 1

	(ii) (I)They have the ability to exhibit variable oxidation states/ tendency to form complex compounds/ large surface area. (II) Due to involvement of (n-1) d and ns electrons which results in strong metallic bond and strong interatomic bonding. (III) Sc has incompletely filled d orbital ($3d^1$) in its ground state whereas Zn has completely filled d orbital ($3d^{10}$) in ground state as well as in its oxidized state.	1 1 1