MODEL QUESTION PAPER

CHEMISTRY
XII – STANDARD (CBSE)

Time: 3 Hours **Max. Marks: 70**

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 **16x1=16**

Note: 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	The colligative property used for the determination of molar mass of polymers and proteins is (a) Osmotic pressure (b) Depression in freezing point (c) Relative lowering in vapour pressure (d) Elevation is boiling point	1
2	Low concentration of oxygen in the blood and tissues of people living at high altitude is due to (a) High atmospheric pressure (b) Low temperature (c) Low atmospheric pressure (d) Both low temperature and high atmospheric pressure	1
3	Which of the following cells is not rechargeable? (a) Dry cell (b) Lead storage battery (c) Ni-Cd battery (d) Fuel cell	1
4	The products of the electrolysis of aqueous NaCl are: (a) H_2 and O_2 (b) H_2, Cl_2 and NaOH (c) H_2, O_2 and Na (d) O_2 and NaOH	1
5	ΔG and E^o_{Cell} for a spontaneous reaction will be (a) Positive, negative (b) Negative, negative (c) Negative, Positive (d) Positive, Positive	1
6	Which of the following is affected by catalyst? (a) ΔH (b) ΔG (c) E_a (d) ΔS	1
7	How many hydrate isomers are possible of the complex with the formula $CrCl_3.6H_2O$? (a) Six (b) Four (c) Three (d) Two	1
8	The most common and stable oxidation state of a lanthanoid is (a) +2 (b) +3 (c) +4 (d) +6	1

9	Which of the following compound is called Picric acid? (a) p-Nitrophenol (b) 2,4-Dinitrophenol (c) 2,4,6-Trinitrophenol (d) 2,6-Dinitrophenol	1
10	1,2-Dichloroethane is heated with KOH (1 mole) in ethanol. The major product formed is: (a) Acetylene (b) Vinyl chloride (c) 2-Chloroethanol (d) Ethylene glycol	1
11	The synthesis of alkyl fluoride is best obtained from (a) Free radicals (b) Swartz reaction (c) Sandmeyer reaction (d) Finkelstein reaction	1
12	An α-helix is a structural feature of (a) Sucrose (b) Starch (c) Polypeptides (d) Nucleotides	1
13	Vitamin B12 is also called: (a) Riboflavin (b) Thiamine (c) Pyridoxine (d) Cyanocobalamine	1
14	The Conversion of an alkyl halide into an alkene by alcoholic KOH is classified as (a) A substitution reaction (b) A addition reaction (c) A dehydrohalogenation reaction (d) A Dehydration reaction	1
15	Assertion: Vanadium had the ability to exhibit a wide range of oxidation states. Reason: The standard potentials of Vanadium are rather small, making a switchbetween oxidation states relatively easy. a) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion. b) Both Assertion and Reason are true and Reason is the correct explanation of Assertion. c) Assertion is fake but Reason is true. d) Assertion is true but Reason is fake.	1
16	Assertion: DNA has a double-strand helix structure. Reason: The two strands in a DNA molecule are exactly similar. a) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion. b) Both Assertion and Reason are true and Reason is the correct explanation of Assertion. c) Assertion is fake but Reason is true. d) Assertion is true but Reason is fake.	1

SECTION - B **5×2=10**

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	What is Henry's law? Give one application of it.	2
18	Write the equation involved in Reimer – Tiemann reaction.	2
19	Explain briefly (a) Carbylamine reaction (b) Gabriel phthalimide synthesis.	2

20	What type of derivation from Raoult's law is shown by ethanol and acetone mixture? Give reason.	2
21	What type of linkage is responsible for the formation of protein?	2

SECTION – C **7x3=21**

This section contains 7 questions with internal choice in one question. The following questions are short answer type and carry 3 marks each.

22	Write main product formed when: (a) Methyl chloride is treated with NaI / Acetone. (b) 2,4,6 – trinitrochlorobenzene is subjected to hydrolysis. (c) n-Butyl chloride is treated with alcoholic KOH.	3
23	How do you convert the following: (a) Phenol to picric acid (b) Phenol to anisole (c) Propene to Propan – 1- ol	3
24	Explain why: (a) Carboxyl group in benzoic acid is meta directing. (b) Sodium bisulphate is used for the purification of aldehydes and ketones. (c) Carboxylic acids do not give characteristics reactions of carbonyl group.	3
25	What are the hydrolysis products of (a) Lactose and (b) Maltose	3
26	How will you convert ethanol to the following compounds? (i) Butane-1, 3-diol (ii) But-2-enal (iii) But-2-enoic acid	3
27	Give the basic structural difference between starch and cellulose.	3
28	a) (i) Draw the structural formulas and write the IUPAC names of all the isomeric alcohols with the molecular formula $C_5H_{12}O$. (ii) Classify the isomers of alcohols given in part as primary, secondary, andtertiary alcohols.	3

SECTION – D **2x4=8**

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 rate of reaction is concerned with decrease in concentration of reactants or increase in the concentration of products per unit time. It can be expressed as instantaneous rate at a particular instant of time and average rate over a large interval of time. Mathematical representation of rate of reaction is given by rate law. Rate constant and order of a reaction can be determined from rate law or its integrated rate equation. (a) What is average rate of reaction? (b) Write two factors that affect the rate of reaction. (c) What happens to rate of reaction for zero order reaction?	4
30	Metal complexes show different colours due to d-d transitions. The complex absorbs light of specific wavelength to promote the electron from t2g to eg	4

	level. The colour of the complex is due to the transmitted light, which is complementary of the colour absorbed. The wave number of light absorbed by different complexes of Cr ion are given below: Answer the following questions: (a) Out of the ligands "A", "B", "C" and "D", which ligand causes maximum crystal field splitting? Why? OR Which of the two, "A" or "D" will be a weak field ligand? Why? (b) Which of the complexes will be violet in colour? $[CrA_6]3^-$ or $[CrB_6]^{3+}$ and why? (Given: If 560 - 570 nm of light is absorbed, the colour of the complex observed is violet.) (c) If the ligands attached to Cr^{3+} ion in the complexes given in the table above are water, cyanide ion, chloride ion, and ammonia (not in this order) Identify the ligand, write the formula and IUPAC name of the following: (i) $[CrA_6]^{3-}$ (ii) $[CrC_6]^{3+}$	

Complex	Wavenumber of light absorbed (cm-1)	Energy of light absorbed(kJ/mol)
$[CrA_6]^{3-}$	13640	163
$[CrB_6]^{3+}$	17830	213
$[CrC_6]^{3+}$	21680	259
$[CrD_6]^{3-}$	26280	314

SECTION – E **3x5=15**

The following questions are long answer type and carry 5 marks each. All questions have an internal choice.

31	Assign reason for each of the following: (a) Manganese exhibits the highest oxidation state of +7 among the 3d series of transition elements. (b) Transition metals and their compounds are generally found to be good catalysts in chemical reactions. (c) Cr^{2+} is reducing in nature while with the same d-orbital configuration (d^4) Mn^{3+} is an oxidizing agent. (d) Zn has lowest enthalpy of atomization. (e) Cu^+ is unstable in an aqueous solution.	5
32	(i) Carry out the following conversions: (a) Ethanal to But-2-en-1-al (b) Propanoic acid to 2-chloropropanoic acid. (ii) An alkene 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 compounds 'A', 'B' and 'C'.	5
33	(i) Define lanthanoid contraction. Write its two consequences. Why is actinoid contraction greater than lanthanoid contraction? (ii) Write the preparation of $Na_2Cr_2O_7$ from chromite ore.	5