SET B

केंद्रीय विद्यालय संगठन,अहमदाबाद संभाग

Kendriya Vidyalaya Sangathan, Ahmedabad Region

कक्षा बारहवीं प्री-बोर्ड - द्वितीय परीक्षा 2025-26

PRE-BOARD II EXAMINATION 2025-26 for Class XII

SUBJECT: CHEMISTRY (043)

M.M.: 70 **TIME: 3 Hours**

सामान्य निर्देश **/GENERAL INSTRUCTIONS:**

1. There are 33 questions in this question paper with internal choice.
2. Section A consists of 16 multiple -choice questions carrying 1 mark each.
3. Section B consists of 5 short answer questions carrying 2 marks each.
4. Section C consists of 7 short answer questions carrying 3 marks each.
5. Section D consists of 2 case - based questions carrying 4 marks each.
6. Section E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.
8. Use of log tables and calculators is not allowed. Required log values are given below-

(antilog 0.53=3.41**,** antilog 0.167=1.47, log 3 =0.47, log 5=0.7, log7 =0.84, log2= 0.30)

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 Molecule whose mirror image is non-superimposable over them are known as optical isomers. Which of the following molecules is chiral in nature?
(a) 2 – bromobutane (b) 1 – bromo–3–methyl butane
(c) 3 – Bromo pentane (d)2 – bromo propan –2–ol

2 For the best yield of ether from Williamson"s synthesis, the alkyl halide should preferable be:
(a) Secondary (b) Primary
(c) Tertiary (d) All

3 What is the decreasing order of the basicity of 1°, 2° and 3° amines and ammonia in gaseous phase?
(a) $NH_3>C_2H_5NH_2>(C_2H_5)_2NH>(C_2H_5)_3N$
(b) $(C_2H_5)_3N>(C_2H_5)_2NH>C_2H_5NH_2>NH_3$
(c) $(C_2H_5)_2NH>C_2H_5NH_2>(C_2H_5)_3N>NH_3$
(d) $(C_2H_5)_2NH>(C_2H_5)_3N>C_2H_5NH_2>NH_3$

4 $RMgX + CO_2 \rightarrow$ **X** Hydrolysis $\rightarrow$ **Y** ; **'Y'** in the above reaction is?
(a) RCOOR (b) RCHO
(c) RCOOH (d) RCOOR

5 Glucose reacts with hydroxylamine to form an oxime. This confirms the presence of:
(a) secondary alcoholic group (b) straight chain of six carbon atoms
(c) primary alcoholic group (d) carbonyl group

6 Vitamin B_6 is :

(a) Riboflavin (b) Ascorbic acid

(c) Thiamine (d) Pyridoxine

7 Why alkyl halides are considered to be very reactive compounds towards nucleophile?

(a) they have an electrophilic carbon & a good leaving group

(b) they have a nucleophilic carbon & a good leaving group

(c) they have a nucleophilic carbon & a bad leaving group

(d) they have an electrophilic carbon & a bad leaving group

8 The quantity of charge required to obtain two mole of aluminium from Al_2O_3 is…….

(a) 1 F (b) 2 F

(c) 3 F (d) 6 F

9 Magnetic moments (BM) of transition elements 1,2,3 and 4 are:

1	2	3	4
2.84	4.90	5.92	3.87

(a) $1=Ti^{2+}$, $2=Cr^{2+}$, $3=Mn^{2+}$, $4=V^{2+}$

(b) $1=Ti^{2+}$, $2=Mn^{2+}$, $3=Cr^{2+}$, $4=V^{2+}$

(c) $1=V^{2+}$, $2=Cr^{2+}$, $3=Mn^{2+}$, $4=Ti^{2+}$

(d) $1=Ti^{2+}$, $2=Cr^{2+}$, $3=V^{2+}$, $4=Mn^{2+}$

10 Zr and Hf have almost equal atomic and ionic radii because of

(a) diagonal relationship (b) actinoid contraction

(c) lanthanoid contraction (d) belonging to the same group

11 What are the units of k for the rate law: Rate = $k[A][B]^0$, when the concentration unit is mol/L?

(a) $L\ mol^{-1}\ s^{-1}$ (b) $L^2\ mol^{-2}\ s^{-1}$

(c) s^{-1} (d) $L^{-1}\ mol\ s^{-1}$

12 In comparison to a 0.01 M solution of glucose, the elevation in boiling point of a 0.01 M $MgCl_2$ solution is :-

(a) Same (b) about twice

(c) about three times (d) about four times.

Question number 13-16 are of assertion–reason type questions. Select the most appropriate answer from the options given below:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

13 **Assertion:** A solution of acetone and chloroform has lower vapour pressure than that of pure components.

Reason: Acetone and chloroform forms intermolecular hydrogen bond in the solution.

14 **Assertion:** Secondary cells are used in invertors.

Reason: A primary cell can be recharged by passing current through it in the opposite direction after it has been used.

15 **Assertion**: SN_2 reaction of an optically active alkyl halide with an aqueous solution of KOH always gives an alcohol with opposite sign of rotation.

Reason: SN_1 reactions always proceed with racemisation.

16 **Assertion**: Decomposition of ammonia on a hot Pt surface is a zero reaction.

Reason: Rate of the reaction depends on concentration of ammonia

SECTION B

This section contains 5 questions with internal choice in one question. These questions are very short answer type and carry 2 marks each.

17 (i) Arrange the following in the increasing order of boiling point

0.1M $Al_2(SO_4)_3$, 0.1M KCl, 0.1M Glucose, 0.1M $[Co(NH_3)_6]Cl_3$

(ii) What happens when blood cells are kept in 0.2% NaCl solution.

18 Write the following reactions:

(a) Cannizzaro reaction of Benzaldehyde (b) Aldol condensation of Ethanal

19 (i) Write chemical equation for the following conversions:

$CH_3 –CH_2 –Cl$ into $CH_3 –CH_2 –CH_2 –NH_2$

(ii) Write structures and IUPAC names of the amide which gives ethanamine by Hoffmann bromamide reaction.

20 Explain giving reasons:

(i) Transition metals and many of their compounds show paramagnetic behaviour.

(ii) The enthalpies of atomisation of the transition metals are high.

OR

Explain giving reasons:

(i) The transition metals generally form coloured compounds.

(ii) Transition metals and their many compounds act as good catalyst

21 Determine the amount of $CaCl_2$ (i = 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27° C

SECTION C

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

22 (i) Write the formulas for the following coordination compound:

(a) tetraamminediaquacobalt(III) chloride

(b) tris(ethane–1,2–diamine) chromium(III) chloride

(ii) Explain on the basis of valence bond theory that $[Ni(CN)_4]^{2-}$ ion with square planar structure is diamagnetic and the $[NiCl_4]^{2-}$ ion with tetrahedral geometry is paramagnetic.

23 (i) How will you convert 4-nitrotoluene to 2-bromobenzoic acid ?

(ii) Although amino group is o– and p– directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline

24 (i) Describe the preparation of potassium dichromate from iron chromite ore.

(ii) What is the effect of increasing pH on a solution of potassium dichromate?

25 2 g of benzoic acid (C_6H_5COOH) dissolved in 25 g of benzene shows a depression in freezing point equal to 1.62 K. Molal depression constant for benzene is 4.9 K kg mol^{-1}. What is the percentage association of acid if it forms dimer in solution?

26 (i) Write the equations involved in the following reactions:

(a) Reimer - Tiemann reaction (b) Kolbe's reaction

(ii) Show how will you synthesise 1-phenylethanol from a suitable alkene.

27 Determine the values of equilibrium constant (K_c) and ΔG° for the following reaction

$Ni(s) + 2Ag^+ (aq) \rightarrow Ni^{2+} (aq) + 2Ag(s)$, E° = 1.05 V

OR

Define conductivity. Explain the variation of conductivity and molar conductivity with concentration. Also draw the graph.

28 Explain why

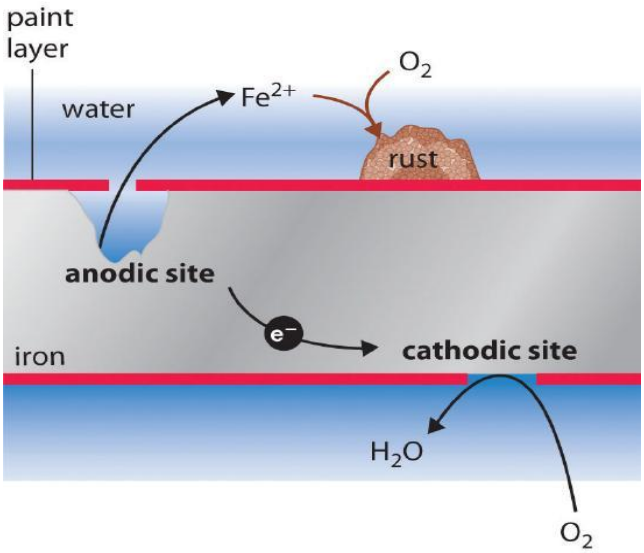
(i) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride? (ii) alkyl halides, though polar, are immiscible with water?

(iii) Grignard reagents should be prepared under anhydrous conditions?

SECTION D

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 **"Electrochemical Cells and Corrosion"**



An electrochemical cell consists of zinc and copper electrodes. The cell notation is:
$Zn(s) \mid Zn^{2+}(aq, 1\ M) \mid\mid Cu^{2+}(aq, 1\ M) \mid Cu(s)$
The standard reduction potentials are:
$E°(Zn^{2+}/Zn) = -0.76\ V$, $E°(Cu^{2+}/Cu) = +0.34\ V$
Corrosion slowly coats the surfaces of metallic objects with oxides or other salts of the metal. The rusting of iron, tarnishing of silver, development of green coating on copper and bronze are some of the examples of corrosion.
In corrosion, a metal is oxidised by loss of electrons to oxygen and formation of oxides. Corrosion of iron occurs in presence of water and air. The chemistry of corrosion is quite complex but it may be considered essentially as an electrochemical phenomenon.
Electrons released at anodic spot move through the metal and go to another spot on the metal and reduce oxygen in the presence of H^+ (which is believed to be available from H_2CO_3 formed due to dissolution of carbon dioxide from air into water. Hydrogen ion in water may also be available due to dissolution of other acidic oxides from the atmosphere). This spot behaves as cathode with the reaction
Prevention of corrosion is of prime importance. It not only saves money but also helps in preventing accidents such as a bridge collapse or failure of a key component due to corrosion. One of the simplest methods of preventing corrosion is to prevent the surface of the metallic object to come in contact with atmosphere
Zinc metal is used to prevent corrosion of iron by galvanization. The protection is based on the principle of a more active metal preventing corrosion of a less active one.

i Write the cell reaction and calculate the EMF of the cell.

OR

Write the chemical equation occurs at anode and cathode during rusting of iron.

ii Write the formula of rust.

iii Explain how zinc prevents corrosion of iron.

30 **"Importance of Coordination Compounds"**

The coordination compounds are of great importance. These compounds are widely present in the mineral, plant and animal worlds. Coordination compounds find use in many qualitative and quantitative chemical analysis. The familiar colour reactions given by metal ions with a number of ligands (especially chelating ligands), as a result of formation of coordination entities, form the basis for their detection and estimation by classical and instrumental methods of analysis. Some important extraction processes of metals, like those of silver and gold, make use of complex formation.

Coordination compounds are of great importance in biological systems. The pigment responsible for photosynthesis, chlorophyll, is a coordination compound of magnesium. Haemoglobin, the red pigment of blood which acts as oxygen carrier is a coordination compound of iron. Vitamin B_{12}.

Coordination compounds are used as catalysts for many industrial processes. Examples include rhodium complex, a Wilkinson catalyst, is used for the hydrogenation of alkenes.

Cisplatin is a coordination compound used as an anticancer drug. It binds to DNA, causing cells to stop dividing. The compound trans-platin, however, is not effective as an anticancer drug.

i Write the formula of Wilkinson catalyst.

ii Write the IUPAC name of cisplatin.

iii Which type if isomerism is shown by Cisplatin. Draw the isomers of Cisplatin.

OR

Why is the cis form effective while trans form is not?

SECTION E

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

31 i Define the order of reaction.

ii For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

iii The activation energy for the reaction
$2\ HI(g) \rightarrow H_2 + I_2\ (g)$ is 209.5 kJ mol^{-1} at 581K.Calculate the fraction of molecules of reactants having energy equal to or greater than activation energy?

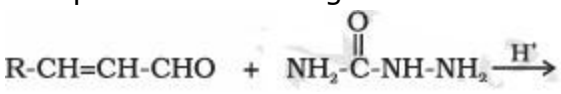
OR

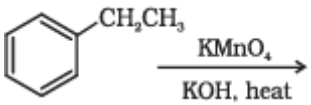
i Define collision frequency.

ii Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.

iii The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.

32 i Complete the following reactions-

(a) 

(b) 

ii An organic compound (A) with molecular formula C8H8O forms an orange-red precipitate with 2,4-DNP reagent and gives yellow precipitate on heating with iodine in the presence of sodium hydroxide. It neither reduces Tollens' or Fehlings' 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 $C_7H_6O_2$. Identify the compounds (A) and (B) and explain the reactions involved.

OR

i Write product and name of reaction involved, when ethanoic acid heated with concentrated Br_2 in presence of red phosphorous.

ii Write suitable chemical test to distinguish benzaldehyde and propanal.

iii An organic compound with the molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollens' reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. Identify the compound and write the chemical reactions involved.

33 i What happens when D-glucose is treated with the following reagents?
(a) HI (b) Bromine water (c) HNO_3 (Write the reactions also)

ii What are the hydrolysis products of (a) sucrose and (b) lactose?

OR

i What is the basic structural difference between starch and cellulose?

ii Why sucrose is reducing sugar whereas maltose is reducing although both are disaccharides.

iii What is the difference between a nucleoside and a nucleotide?

iv Enumerate the reactions of D-glucose which cannot be explained by its open chain structure (Any two)

****