



P.V.G.'s
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Preliminary Examination (2025-26)
Standard - XII

Subject : Chemistry

Marks : 70

Date : 07.01.2026

Time : 8.15 am to 11.15 am

- Instructions :
- 1) All sections are compulsory.
 - 2) Use of log table is allowed. Use of Calculator is not allowed.
 - 3) Figures to the right indicate full marks.
 - 4) The question paper is divided into four sections.
Section A : Each 1 Marks Section B : Each 2 Marks
Section C : Each 3 Marks Section D : Each 4 Marks
 - 5) For each multiple choice question it is mandatory to write correct answer along with its alphabets.
 - 6) Write balanced chemical equations wherever required.
 - 7) Physical constant : $N_A = 6.022 \times 10^{23}$, $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$

Section A

Q.1 Select and write correct answer from given alternatives. (10)

- 1) SI unit of cryoscopic constant is _____.
a) K mol^{-1} b) K kg mol^{-1} c) K kg L^{-1} d) K kg mol
- 2) The pH of 0.02M HCl solution is _____.
a) 10 b) 3 c) 1.70 d) 11
- 3) In a particular reaction 12KJ of heat is released by the system and 20KJ of work is done on the system. The value of ΔU is _____.
a) -6kJ b) +4kJ c) +8kJ d) -2kJ
- 4) The standard cell potential for the reaction
 $\text{Zn}_{(s)} + \text{Cu}^{2+}_{(aq)} \longrightarrow \text{Zn}^{2+}_{(aq)} + \text{Cu}_{(s)}$ is _____.
(Given $E^0_{\text{Zn}^{2+}/\text{Zn}} = -0.76\text{V}$, $E^0_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V}$)
a) -1.10V b) +1.10V c) +0.42V d) -0.42V
- 5) The oxidation state of Ni in $[\text{Ni}(\text{CO})_4]$ is _____.
a) +4 b) +2 c) 0 d) -2

- 6) Ozonolysis of 2, 3- Dimethylbut-2-ene, followed by decomposition by Zn dust and water gives _____.
 a) acetaldehyde b) propionaldehyde c) acetone d) butyraldehyde
- 7) Hinsberg's reagent is _____.
 a) Benzene sulphonyl Chloride b) Benzyl Chloride
 c) Benzoic acid d) Benzaldehyde
- 8) Lactose on hydrolysis gives _____.
 a) galactose + glucose b) 2 molecules of glucose
 c) fructose + glucose d) fructose + galactose
- 9) The monomer of Teflon is _____.
 a) $\text{CF}_2 = \text{CF}_2$ b) $\text{CH}_2 = \text{CH}_2$ c) $\text{CF}_3 - \text{CF}_3$ d) $\text{CH}_2 = \text{CHCl}$
- 10) ZWT in green chemistry stands for _____.
 a) zero waiting time b) zero waste technology
 c) zero water technology d) zhen wu tang.

Q.2 Answer the following in short.

(8)

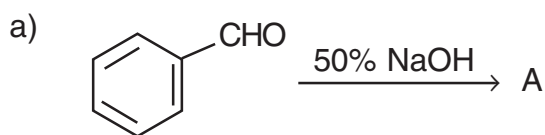
- 1) Write mathematical relation between half life of zero order reaction and its rate constant.
- 2) Write chemical composition of cryolite.
- 3) Name the alloy used in Fischer- Tropsch process in the synthesis of gasoline.
- 4) Write the structure of the product formed when chlorobenzene is treated with sodium metal in the presence of dry ether.
- 5) Write the correct condition for spontaneity in terms of Gibb's energy.
- 6) 23g of ethanol is vaporised by supplying 20kJ of heat. Calculate enthalpy of vaporization of ethanol.
- 7) Write IUPAC name of $(\text{CH}_3)_2\text{CH-CHO}$
- 8) State second law of thermodynamics.

Section B

Attempt any eight of the following

(16)

- Q.3** When gold crystallises, it forms FCC cells. The unit cell edge length is 4×10^{-8} cm. Calculate the density of gold.
(Molar mass of gold = 197 g mol^{-1})
- Q.4** Define: 1) Isotonic solution
2) Osmotic pressure
- Q.5** 'Dissociation of HCN is suppressed by the addition of HCl'. Explain
- Q.6** Derive the expression for the maximum work in an isothermal reversible expansion of an ideal gas.
- Q.7** Write the electrode reactions during electrolysis of molten NaCl.
- Q.8** What is pseudo first order reaction? Explain with suitable example.
- Q.9** Draw structure of sulphurous acid. Write two uses of Helium.
- Q.10** Write factors which affect the colour of transition metal ions.
- Q.11** Write structures for the following complexes.
a) Sodium hexacyanoferrate (III)
b) Diammine dichloroplatinum (II)
- Q.12** Write balanced chemical reactions for the following.
a) Chlorobenzene is heated with fuming H_2SO_4 .
b) Ethyl bromide is heated with silver acetate.
- Q.13** Write a note on Kolbe's reaction.
- Q.14** Identify A and B in the following reaction and rewrite the complete balanced reactions.



Section C

Attempt any eight of the following.

(24)

Q.15 Define - Anisotropy

Write consequences of Schottky defect with reasons.

Q.16 i) Write one example of each - 1) Acidic buffer

2) Basic buffer

ii) Write relationship between solubility and solubility product of PbI_2 .

Q.17 i) Derive relation between ΔH & ΔU for a chemical reaction.

ii) Define - Enthalpy of fusion

Q.18 The vapour pressure of pure benzene (molar mass = 78g/mol) at a certain temperature is 640 mm Hg. A nonvolatile solute of mass 2.315 g is added to 49 g of benzene. The vapour pressure of solution is 600 mm Hg. What is the molar mass of solute?

Q.19 The half life of a first order reaction is 1.7 hours. How long will it take for 20% of the reactant to react?

Q.20 Explain anomalous behaviour of oxygen in group 16 with respect to

1) Atomicity

2) Magnetic Property

3) Oxidation State

Q.21 Calculate spin only magnetic moment of Mn^{2+} .

(atomic number of Mn = 25)

Why is Sc^{3+} is colourless while Ti^{3+} is coloured?

Q.22 How is phenol converted into the following.

a) Benzene

b) Benzoquinone

c) Picric acid

Q.23 Write a note on Hoffmann bromamide degradation.

Explain whether it is step up or step down reaction?

Q.24 1) Write Haworth projection formula for

α - D - (+) - Glucopyranose

2) Write any two examples of globular proteins.

Q.25 Write names and structures of monomers of Nylon 6, 6

Write reactions for the formation of Nylon 6, 6 polymer.

Q.26 Explain 'Atom Economy' principle of green chemistry with suitable example.

Section D

Attempt any Three of the following

(12)

- Q.27**
- What is action of concentrated H_2SO_4 on following.
 - Cu
 - sucrose
 - Explain ‘ H_2O is liquid while H_2S is gas at room temperature’.
- Q.28**
- Write the formula to calculate EAN.
 - Explain formation of $[\text{Co}(\text{NH}_3)_6]^{3+}$ complex ion with respect to -
 - Type of hybridisation
 - Geometry
 - Magnetic property
- Q.29**
- Write salient features of S_{N}^1 mechanism.
 - Draw enantiomers of 2- Chlorobutane.
- Q.30**
- Explain Aldol condensation for ethanal.
 - Write one example of each
 - Simple Ketone
 - Mixed Ketone
- Q.31**
- What is the mass of Cu metal produced at the cathode during the passage of 5 ampere current through CuSO_4 solution for 100 minutes. Molar mass of Cu is 63.5 gmol^{-1} .
 - Draw a neat and labelled diagram for lead storage battery.



