

KENDRIYA VIDYALAYA COMMAND HOSPITAL

1ST PREBOARD 2012-13

CLASS XII
CHEMISTRY

TIME: 3 Hours

MARKS: 70

GENERAL INSTRUCTIONS

- All questions are compulsory.
- Question nos. 1 to 8 are very short answer questions and carry one mark each.
- Question nos. 9 to 18 are short answer questions and carry two marks each.
- Question nos. 19 to 27 are also short answer questions and carry three marks each.
- Question nos. 28 to 30 are long answer questions and carry five marks each.
- Use log tables if necessary. Calculators are not allowed.

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- Give IUPAC name of the following organic compound $\text{CH}_3 - \text{CH}(\text{OH}) - \text{CH}_2 - \text{CHO}$ (1)
 - What are the physical states of dispersed phase and dispersion medium of gel? (1)
 - Write the balanced equation for complete hydrolysis of XeF_6 . (1)
 - Write the structure of 4 – methoxy pent – 3 – en – 2 – one. (1)
 - A compound contains two types of atoms – X and Y. It crystallizes in a cubic lattice with atom X at the corners the unit cell and atoms Y at the tetrahedral voids. What is the simplest possible formula of this compound? (1)
 - Out of 1 molal NaCl and 1 molal Na_2SO_4 (both aqueous solution) which has higher freezing point? Give reason briefly. (1)
 - What is the role of silica in the metallurgy of copper? (1)
 - Why is ammonia a good complexing agent? (1)
 - How much of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) needs to be added to 500 grams of water so that it boils at 100.37°C ? (2)
Given : K_b for water = $0.512 \text{ K kg mol}^{-1}$
 - Name the two components of starch. How do they differ from each other structurally? (2)
 - Write the reactions involved in the refining of zirconium by van Arkel method. (2)
 - What is meant by the term benefaction? (2)
 - What changes occur in the nature of egg proteins on boiling? (2)

b) Name the type of bonding which stabilizes helix structure in proteins.

13. The following results were obtained during the kinetic study of the reaction : (2)



EXPERIMENT	[A] mol L ⁻¹	[B] mol L ⁻¹	Initial rate of formation of D mol L ⁻¹ min ⁻¹
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law of the reaction.

14. Describe the mechanism of the formation of diethyl ether from ethanol in the presence of concentrated sulphuric acid. (2)

15. Complete and name the following reactions : (2)

- Carbylamine reaction
- Hoffman bromamide reaction

16. Give chemical tests to distinguish between compounds in each the following pairs : (2)

- Phenol and benzyl alcohol
- Ethanal and propanal

17. Predict, giving reasons, the order of basicity of the following compounds in gaseous phase : (2)
C₂H₅NH₂, (C₂H₅)₂NH, NH₃

OR

Account for the following :

- Aromatic primary amines cannot be prepared by Gabriel Phthalamide synthesis.
- Primary amines have higher boiling point than isomeric tertiary amines.

18. a) Suggest the most important type of intermolecular attractive interaction in the following pairs : (2)

- n – hexane
- I₂ and CCl₄

b) Aquatic species are more comfortable in cold water than in warm water. Give reason.

19. An element X with an atomic mass of 60 g mol⁻¹ has density of 6.23 g cm⁻³. If the edge length of its cubic unit cell is 400 pm, identify the type of cubic unit cell. Calculate the radius of an atom of this element. (3)

20. Write the structures of monomers of the following polymers and classify them as addition or condensation polymers : (3)

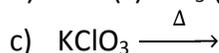
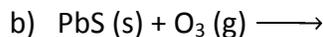
- Teflon

- b) Nylon 6
c) Natural rubber
21. a) Give the IUPAC name of $[\text{CrCl}_2(\text{H}_2\text{O})_4]\text{Cl}$ (3)
b) Which metal forms the coordination complex in haemoglobin?
c) Which type of isomerism is shown by the following pair of coordination compounds?
Also give a chemical test for their distinction.
 $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$
22. Explain the following observations : (3)
a) Aqueous solution of raw sugar, when passed over beds of animal charcoal, becomes colourless.
b) Formation of delta when river water meets the sea water.
c) Alum is added to water to make it fit for drinking purposes.
23. Account for the following : (3)
a) PH_3 has lower boiling point than NH_3 .
b) Elements of group 15 generally show higher value of first ionization enthalpy compared to corresponding members of group 16.
c) Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table.
24. a) The rate constant for a first order reaction is 60 s^{-1} . How much time will it take to reduce the initial concentration of the reactant to $1/16^{\text{th}}$ value? (3)
b) For an elementary reaction $2\text{A} + \text{B} \longrightarrow 3\text{C}$, the rate of appearance of C at time 't' is $1.3 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$. Calculate at this time :
i. Rate of the reaction
ii. Rate of disappearance of A
25. a) Which of the following compound would react faster by $\text{S}_{\text{N}}2$ path way? (3)
1 – bromobutane or 2 – bromobutane
b) Allylic and benzylic halides show high reactivity towards $\text{S}_{\text{N}}1$ reaction. Give reason.
c) Haloalkanes react with KCN to give alkyl cyanide as the main product while with AgCN they form isocyanide as main product. Give reason.
26. a) Draw the structures of the following : (3)
i. Sulphurous acid
ii. Phosphoric acid
iii. White phosphorous
iv. PCl_5
b) ICl is more reactive than I_2 . Give reason.

OR

Complete and balance the following reaction :





27. a) Account for the following : (3)
 i. Aspirin drug helps in the prevention of heart attack.
 ii. Use of aspartame as sweetening agent is limited to cold food and drinks.
 b) What is tincture of iodine? What is its use?

28. a) An organic compound (A) (molecular formula $\text{C}_8\text{H}_{16}\text{O}_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration given but – 1 – ene. Write equations for the reactions involved. (5)
 b) Write chemical equations for the following conversions (not more than two steps) :
 i. Aniline to phenol
 ii. Acetaldehyde to butane – 1, 3 – diol

OR

- a) Identify A, B and C in the following reaction sequence :

$$\text{C}_6\text{H}_5\text{CH}_2\text{OH} \xrightarrow{\text{A}} \text{C}_6\text{H}_5\text{CH}_2\text{Br} \xrightarrow{\text{B}} \text{C}_6\text{H}_5\text{CH}_2\text{CN} \xrightarrow{\Delta, \text{H}_3\text{O}^+} \text{C}$$

- b) How will you convert :
 i. Chloroethane to butane
 ii. Acetone to propene
 iii. 1 – bromopropane to 2 – bromopropane

29. a) A solution of CuSO_4 is electrolysed for 10 minutes with a current of 1.5 amperes. (5)
 What is the mass of copper deposited at the cathode?
 (Atomic mass of Cu = 63)
 b) With the help of a plot explain the variation of molar conductance with concentration for a weak and a strong electrolyte.
 c) Represent the cell with the following reaction and also write the Nernst equation for the same : $\text{Cu (s)} + 2\text{Ag}^+ \text{ (aq)} \longrightarrow 2\text{Ag (s)} + \text{Cu}^{2+} \text{ (aq)}$

OR

- a) The conductivity of 0.001 M acetic acid is $4 \times 10^{-5} \text{ S cm}^{-1}$. Calculate the degree of dissociation of acetic acid, if Λ_m° for acetic acid is $390.5 \text{ S cm}^2 \text{ mol}^{-1}$.
 b) Differentiate between primary and secondary batteries. Give one example of each.

30. a) A blackish coloured solid 'A' when fused with alkali metal hydroxides in the presence of air, produces a dark green coloured compound 'B' which on electrolytic oxidation in alkaline medium gives a dark purple coloured compound C. Identify A, B and C and write the reactions involved. (5)
 b) How does acidified potassium permanganate solution react with oxalate ion? Write the ionic equation for the reaction.
 c) How does the colour of dichromate ion change with change in pH?

OR

- a) Give reasons for the following :
- i. Transition metals have high enthalpies of atomization.
 - ii. Copper (I) has d¹⁰ configuration, while copper (II) has d⁹ configuration, still copper (II) is more stable in aqueous solution than copper (I).
 - iii. The second and third transition series elements have almost similar atomic radii.
- b) Compare the chemistry of actinoids with that of the lanthanoids with reference to
- i. Oxidation state
 - ii. Chemical reactivity