CBSE Board

Class XII Chemistry (Theory)

Board Question Paper 2014 – Set 1

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

Note:

- Please check that this question paper contains 15 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes 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 students will read the question paper only and will not write any answer on the answer-book during this period.

General Instructions:

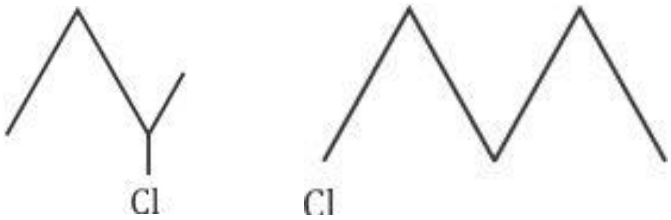
(i) All questions are compulsory.
(ii) Questions number 1 to 8 are very short-answer questions and carry 1 mark each.
(iii) Questions number 9 to 18 are short-answer questions and carry 2 marks each
(iv) Questions number 19 to 27 are also short-answer questions and carry 03 marks each.
(v) Question number 28 to 30 are long-answer questions and carry 5 marks each.
(vi) Use Log Tables, if necessary. Use of calculators is not allowed.

1. What is the effect of temperature on chemisorption ? (1)

2. What is the role of zinc metal in the extraction of silver? (1)

3. What is the basicity of H_3PO_3? (1)

4. Identify the chiral molecule in the following pair : (1)



5. Which of the following is a natural polymer ? (1)
Buna-S, Proteins, PVC

6. The conversion of primary aromatic amines into diazonium salts is known as _____ (1)

7. What are the products of hydrolysis of sucrose? (1)

8. Write the structure of p-methylbenzaldehyde. (1)

9. An element with density 2.8 g cm^{-3} forms a f.c.c. unit cell with edge length 4 × 10^{-8} cm. Calculate the molar mass of the element. (2)
(Given :N_A=6.022 × 10^{23} mol^{-1})

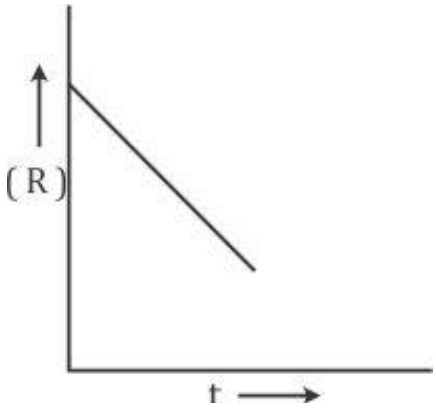
10. (i) What type of non-stoichiometric point defect is responsible for the pink colour of LiCl?
(ii) What type of stoichiometric defect is shown by NaCl? (2)

OR

How Will you distinguish between the following pairs of terms:
(i) Tetrahedral and octahedral voids
(ii) Crystal lattice and unit cell (2)

11. State Kohlrausch law of independent migration of ions. Why does the conductivity of a solution decrease with dilution? (2)

12. For a chemical reaction R ⟶ P, the variation in the concentration (R) vs. time (t) plot is given as (2)



(i) Predict the order of the react.ion.
(ii) What is the slope of the curve?

13. Explain the principle of the method of electrolytic refining of metals. Give one example. (2)

14. Complete the following equations : (2)
(i) $P_4 + H_2O$ ⟶
(ii) $XeF_4 + O_2F_2$ ⟶

15. Draw the structures of the following : (2)
(i) XeF_2
(ii) BrF_3

16. Write the equations involved in the following reactions: (2)
(i) Reimer - Tiemann reaction
(ii) Williamson synthesis

17. Write the mechanism of the following reaction: (2)

$$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O$$

18. Write the name of monomers used for getting the following polymers : (2)
(i) Bakelite
(ii) Neoprene

19. (a) Calculate $\Delta_r G^0$ for the reaction
$Mg\ (s) + Cu^{2+}\ (aq) \longrightarrow Mg^{2+}\ (aq) + Cu\ (s)$

Given: $E^0_{cell} = +2.71\ V$, $1\ F = 96500\ C\ mol^{-1}$

(b) Name the type of cell which was used in Apollo space programme for providing electrical power. (3)

20. The following data were obtained during the first order thermal decomposition of 802Cl2 at a constant volume:

$$SO_2Cl_2(g) \rightarrow SO_2(g) + Cl_2(g)$$

Experiment	Time/s^{-1}	Total pressure/atm
1	0	0.4
2	100	0.7

Calculate the rate constant. (3)
(Given: log 4 = 0.6021, log 2 = 0.3010)

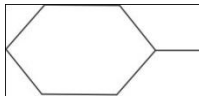
21. What are emulsions? What are their different types? Give one example of each type. (3)

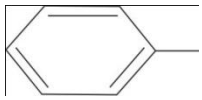
22. Give reasons for the following: (3)

(i) $(CH_3)_3 P = O$ exists but $(CH_3)_3 N = O$ does not.
(ii) Oxygen has less electron gain enthulpy with negative sign than sulphur.
(iii) H_3PO_2 is a stronger reducing agent than $HaPO_3$.

23. (i) Write the IUPAC name of the complex $[Cr(NH_3)_4 Cl_2]Cl$.
(ii) What type of isomerism is exhibited by the complex $[Co (en)_3]^{3+}$?
(en= ethane-1,2-diamine)
(iii) Why is $[NiCl_4]^{2-}$ paramagnetic but $[Ni (C0)_4]$ is diamagnetic?
(At. nos. : Cr = 24, Co = 27, Ni = 28) (3)

24. (a) Draw the structures of major monohalo products in each of the following reactions:

i)  $CH^2OH \xrightarrow{PCl_6}$

ii)  $CH_2\text{-}CH{=}CH_2 + HBr \rightarrow$

(b) Which halogen compound in oach of the following pairs will react faster in S_N2 reaction :
(i) CH_3Br or CH_3I
(ii) $(CH_3)_3 C\text{-} Cl$ or $CH_3 - Cl$

25. Account for the following: (3)
(i) Primary amines ($R\text{-}NH_2$) have higher boiling point than tertiary amines (R_3N).
(ii) Aniline does not undergo Friedel - Crafts reaction.
(iii) $(CH_3)_2NH$ is more basic than $(CH_3)_3N$ in an aqueous solution.

OR

Give the structures of A, B and C in the following reactions:

(i) $C_6H_5NO_2 \xrightarrow{Sn+HCl} A \xrightarrow[273K]{NaNO_2+HCl} B \xrightarrow{H_2O} C$

(ii) $CH_3CN \xrightarrow{H_2O/H^+} A \xrightarrow[\Delta]{NH_3} B \xrightarrow{Br_2+KOH} C$

26. Define the following terms as related to proteins: (3)
(i) Peptide linkage
(ii) Primary structure
(iii) Denaturation

27. On the occasion of World Health Day, Dr. Satpal organized a 'health camp' for the poor farmers living in a nearby village. After check-up, he was shocked to see that most of the farmers suffered from cancer due to regular exposure to pesticides and many wore diabetic. They distributed free medicines to them. Dr. Satpal immodiately reported the matter to the National Human Rights Commission (NHRC). On the suggestions of NHRC, the government decided to provide medical care, financial assistance, setting up of super-speciality hospitals for treatment and prevention of the deadly disease in the affected villages all over India.
(i) Write the values shown by
(a) Dr. Satpal
(b) NHRC.

(ii) What type of analgesics are chiefly used for the relief of pains of terminal cancer?

(iii) Give an example of artificial sweetener that could have been recommended to diabetic patients. (3)

28. (a) Define the following terms :
(i) Molarity
(ii) Molal elevation constant (K_b)

(b) A solution containing 15 g urea (molar mass = 60 g mol^{-1}) per litre of solution in water has the same osmotic pressure (Isotonic) as a solution of glucose (molar mass = 180 g mol^{-1}) in water. Calculate the mass of glucose present in omllitre of its solution. (2,3)

OR

(a) What type of deviation is shown by a mixture of ethanol and acetone? Give reason.

(b) A solution of glucose (molar mass = 180 g $mol^{-1)}$ in water is labelled as 10% (by mass). What would be the molality and molarity of the solution?
(Density of solution= 1.2 g mL^{-1}) (2,3)

29. (a) Complete the following equations :

(i) $Cr_2O_7^{2-} + 2OH^- \rightarrow$

(ii) $MnO_4^- + 4H^+ + 3e^- \rightarrow$

(b) Account for the following:

(i) Zn is not considered as a transition element.

(ii) Transition metals form a large number of complexes.

(iii) The E^0value for the Mn^{3+}/Mn^{2+} couple is much more positive than that for Cr^{3+}/cr^{2+} couple. (2,3)

OR

(i) With reference to structural variability and chemical reactivity, write the differences between lanthanoids and actinoids.

(ii) Name a member of the lanthanoid series which is well known to exhibit +4 oxidation state.

(iii) Complete the following equation :

$MnO_4^- + 8H^+ + 5e^- \rightarrow$

(iv) Out of Mn^{3+} and Cr^{3+}, which is more paramagnetic and why?
(Atomic nos. : Mn =25, Cr = 24) (5)

30. (a) Write the products formed when CH_3CHO reacts with the following reagents:

(i) HCN

(ii) H_2N - OH

(iii) CH_3CHO in the presence of dilute NaOH

(b) Give simple chemical tests to distinguish between the following pairs of compounds:

(i) Benzoic acid and Phenol

(ii) Propanal and Propanone (2,3)

OR

(a) Account for the following:

(i) Cl - CH_2COOH is a stronger acid than CH_3COOH.

(ii) Carboxylic acids do not give reactions of carbonyl group.

(b) Write the chemical equations to illustrate the following name reactions:

(i) Rosenmund reduction

(ii) Cannizzaro's reaction

(c) Out of CH_3CH_2-CO - CH_2 - CH_3 and CH_3CH_2- CH_2- CO – CH_3 , which gives iodoform test ? (2,2,1)