

CBSE
Class XII Chemistry
Board Paper – 2016

Time: 3 hour

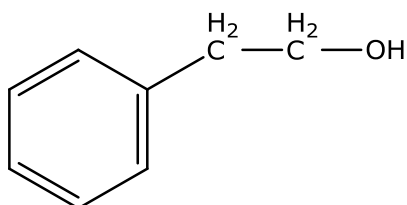
Total Marks: 70

General Instructions:

- (i) All questions are compulsory.
- (ii) Question numbers 1 to 5 are very short answer questions and carry 1 mark each.
- (iii) Question numbers 6 to 10 are short answer Questions and carry 2 marks each.
- (iv) Question numbers 11 to 22 are also short answer Questions and carry 3 marks each.
- (v) Question number 23 is a value based Question and carries 4 marks.
- (vi) Question numbers 24 to 26 are long answer Questions and carry 5 marks each.
- (vii) Use log tables, if necessary. Use of calculators is not allowed.

Section A

1. Write the IUPAC name of the given compound:



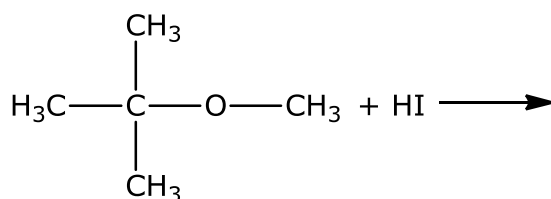
2. Write the structure of an isomer of compound C_4H_9Br which is most reactive towards S_N1 reaction.
3. What is the reason for the stability of colloidal sols?
4. Give an example each of a molecular solid and an ionic solid.
5. $Pb(NO_3)_2$ on heating gives a brown gas which undergoes dimerisation on cooling? Identify the gas.
6. For a reaction: $H_2 + Cl_2 \xrightarrow{h\nu} 2HCl$
Rate = k
 - (i) Write the order and molecularity of this reaction.
 - (ii) Write the unit of k.

7. Write the chemical equations involved in the following reactions:
 (i) Hoffmann-bromamide degradation reaction
 (ii) Carbylamine reaction
8.
 (i) Gas (A) is more soluble in water than Gas (B) at the same temperature. Which one of the two gases will have the higher value of K_H (Henry's constant) and why?
 (ii) In non-ideal solution, what type of deviation shows the formation of maximum boiling azeotropes?
9. When a coordination compound $\text{CoCl}_3 \cdot 6\text{NH}_3$ is mixed with AgNO_3 , 3moles of AgCl are precipitated per mole of the compound. Write
 (i) Structural formula of the complex
 (ii) IUPAC name of the complex
10. Write the structures of the following:
 (i) BrF_3
 (ii) XeF_4

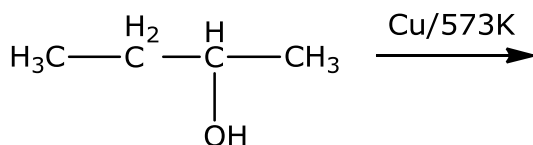
OR

What happens when:

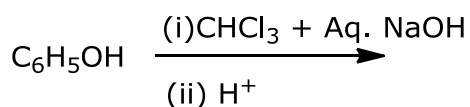
- (i) SO_2 gas is passed through an aqueous solution Fe^{+3} salt?
 (ii) XeF_4 reacts with SbF_5 ?
11. Write the final product(s) in each of the following reactions:
 (a)



(b)



(c)



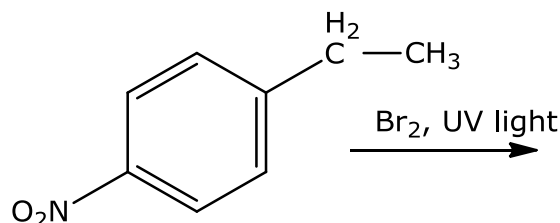
12. How do you convert:

- (i) Chlorobenzene to biphenyl
- (ii) Propene to 1-iodopropane
- (iii) 2-bromobutane to but-2-ene

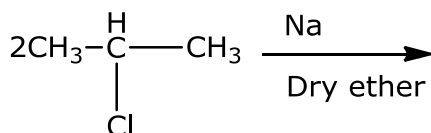
OR

Write the major product(s) in the following:

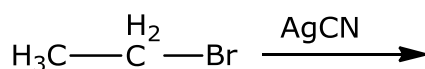
(i)



(ii)



(iii)



13.

- (i) Write the structural difference between starch and cellulose.
- (ii) What type of linkage is present in nucleic acids?
- (iii) Give one example each for fibrous protein and globular protein.

14. Give reasons:

- (i) Name the method of refining of nickel.
- (ii) What is the role of cryolite in the extraction of aluminium?
- (iii) What is the role of limestone in the extraction of iron from its oxides?

15. Give reasons:

- (i) SO_2 is reducing while TeO_2 is an oxidising agent.
- (ii) Nitrogen does not form pentahalide.
- (iii) ICl is more reactive than I_2 .

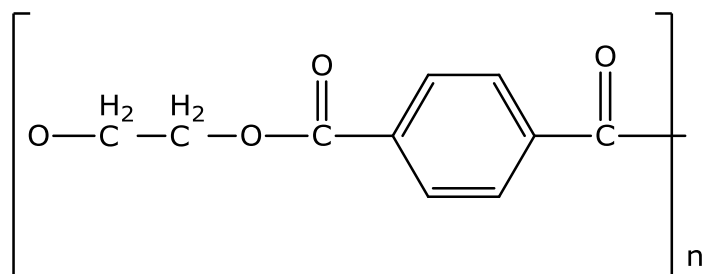
16.

- (a) For the complex $[\text{Fe}(\text{H}_2\text{O})_6]^{+3}$, write the hybridisation, magnetic character and spin of the complex. (At, number : Fe = 26)
- (b) Draw one of the geometrical isomers of the complex $[\text{Pt}(\text{en})_2\text{Cl}_2]^{+2}$ which is optically inactive.

- 17.** An element crystallises in a b.c.c lattice with cell edge of 500 pm. The density of the element is 7.5 g cm^{-3} . How many atoms are present in 300 g of the element?

18.

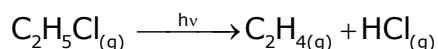
- (i) What is the role of sulphur in the vulcanisation of rubber?
(ii) Identify the monomers in the following polymer:



- (iii) Arrange the following polymers in the decreasing order of their intermolecular forces:

Terylene, Polythene, Neoprene

- 19.** For the first order thermal decomposition reaction, the following data were obtained:



Time / sec	Total pressure / atm
0	0.30
300	0.50

Calculate the rate constant.

(Given: $\log 2 = 0.301$, $\log 3 = 0.4771$, $\log 4 = 0.6021$)

- 20.** Give reasons for the following:

- (i) Aniline does not undergo Friedel-Crafts reaction.
(ii) $(\text{CH}_3)_2\text{NH}$ is more basic than $(\text{CH}_3)_3\text{N}$ in an aqueous solution.
(iii) Primary amines have higher boiling point than tertiary amines.

- 21.** Define the following terms:

- (i) Lyophilic colloid
(ii) Zeta potential
(iii) Associated colloids

- 22.** Calculate the boiling point of solution when 4g of MgSO_4 ($M = 120 \text{ g mol}^{-1}$) was dissolved in 100g of water, assuming MgSO_4 undergoes complete ionization.
(K_b for water = $0.52 \text{ K kg mol}^{-1}$)

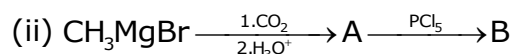
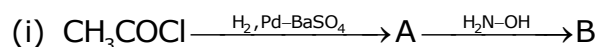
- 23.** Due to hectic and busy schedule, Mr Angad made his life full of tensions and anxiety. He started taking sleeping pills to overcome the depression without consulting the doctor. Mr Deepak, a close friend of Mr. Angad advised him to stop taking sleeping pills and suggested to change his life lifestyle by doing yoga, meditation and some physical exercise. Mr. Angad followed his friend's advice and after few days he started feeling better.

After reading the above passage, answer the following"

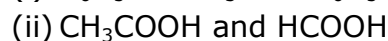
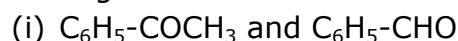
- What are the values (at least two) displayed by Mr. Deepak?
- Why is it not advisable to take sleeping pills without consulting doctor?
- What are tranquilisers? Give two examples.

24.

- (a) Write the structures of A and B in the following reactions:



- (b) Distinguish between:

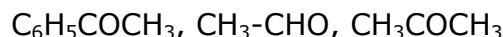


- (c) Arrange the following in the increasing order of their boiling points:

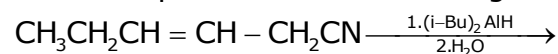


OR

- (a) Write the chemical reaction involved in Wolff-Kishner reduction.
(b) Arrange the following in the increasing order of their reactivity towards nucleophilic addition reaction:



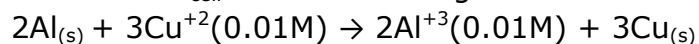
- (c) Why carboxylic acid does not give reactions of carbonyl group?
(d) Write the product in the following reaction



- (e) A and B are two functional isomers of compound $\text{C}_3\text{H}_6\text{O}$. On heating with NaOH and I_2 , isomer B forms yellow precipitate of iodoform whereas isomer A does not form any precipitate. Write the formulae of A and B.

25.

- (a) Calculate E°_{cell} for the following reaction at 298K:



Given: $E_{\text{cell}} = 1.98\text{V}$

- (b) Using the E° values of A and B, predict which is better for coating the surface of iron [$E^\circ(\text{Fe}^{+2}/\text{Fe}) = -0.44\text{V}$] to prevent corrosion and why?

Given: $E^\circ(\text{A}^{+2}/\text{A}) = -2.37\text{V}$; $E^\circ(\text{B}^{+2}/\text{B}) = -0.14\text{V}$

OR

- (a) The conductivity of 0.001 mol L⁻¹ solution of CH₃COOH is 3.905 × 10⁻⁵ S cm⁻¹. Calculate its molar conductivity and degree of dissociation (α). Given λ^o(H⁺) = 349.6 S cm² mol⁻¹ and λ^o(CH₃COO⁻) = 40.9 S cm² mol⁻¹.
- (b) Define electrochemical cell. What happens if external potential applied becomes greater than E^o_{cell} of electrochemical cell?

26.

- (a) Account for the following:
- Mn shows the highest oxidation state of +7 with oxygen but with fluorine, it shows oxidation state of +4.
 - Cr⁺² is a strong reducing agent.
 - Cu⁺² salts are coloured, while Zn⁺² salts are white.
- (b) Complete the following equations:
- $2\text{MnO}_2 + 4\text{KOH} + \text{O}_2 \xrightarrow{\Delta}$
 - $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{I}^- \longrightarrow$

OR

The elements of 3d transition series are given as:

Sc Ti V Cr Mn Fe Co

Answer the following:

- Write the element which shows maximum number of oxidation states. Give reason.
- Which element has the highest m.p?
- Which element shows only +3 oxidation state?
- Which element is a strong oxidising agent in +3 oxidation state and why?