CBSE
CLASS – XI
CHEMISTRY
SAMPLE PAPER 1

Time: 3 Hours **Marks: 70**

General Instructions

- All questions are compulsory.
- Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.
- Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.
- Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.
- Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.
- There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- Use of log tables if necessary, use of calculators is not allowed.

Section A

1. Explain why o- nitrophenol has a lower boiling point than p – nitrophenol? [1]

OR

Which of the two - $O_2NCH_2CH_2O^-$ or $CH_3CH_2O^-$ is expected to be more stable and why?

2. Out of CO_2 and BF_3, which one of them will have a larger bond angle and why? [1]

OR

Why N2 is more stable than O_2? Explain on the basis of molecular orbital theory.

3. Is the eclipsed conformation of propane has the same or different energy as the eclipsed conformation of ethane? [1]

4. Due to which compound, ozone depletion is caused in Antarctica? [1]

5. Why are alkali metals used in photoelectric cells? [1]

Section B

6. Which of the following statements related to the modern periodic table is incorrect and why? [2]

(a) Each block contains a number of columns equal to the number of electrons that can occupy that sub shell.

(b) The d - block has 8 columns, because a maximum 8 electrons can occupy all the orbitals in d - sub shell.

7. All transition metals are d-block elements but all d-block elements are not transition metals. Explain. [2]

8. One of the spectral line of the caesium has a wavelength of 456 nm. Calculate the frequency of this line. [2]

9. PbO andPbO_2 react with HCl according to the following reactions: [2]

$2PbO + 4HCl \rightarrow 2PbCl_2 + 2H_2O$

$PbO_2 + 4HCl \rightarrow PbCl_2 + Cl_2 + 2H_2O$

Why do these compounds differ in their reactivity?

10. Consider the reaction of water with F_2 and suggest, in terms of oxidation and reduction, which species are oxidized/ reduced. [2]

OR

Complete the following reactions:

(a) $PbS_{(g)} + H_2O_{2(aq)} \rightarrow$

(b) $CO_{(g)} + 2\ H_{2(g)} \xrightarrow[\text{catalyst}]{\text{Cobalt}}$

11. Why do magnesium and beryllium not impart colour to the flame in the flame test? [2]

12. Calculate the mass percent of different elements in sodium sulphate,(Na_2SO_4) [2]

OR

How much copper can be obtained from 100 g of copper sulphate ($CuSO_4$)?
(Atomic mass of Cu – 63.5 amu)

Section C

13. [3]

(a) The 4f sub shell of an atom contains 12 electrons. What is the maximum number of electrons having the same spin in it?

(b) Explain the meaning of 4p6.

(c) Write the electronic configuration of the atom with atomic number 29

OR

(a) Calculate the total number of electrons present in one mole of methane.

(b) An atomic orbital has n = 3. What are the possible values of l and m_l?

14. Explain the hybridisation of SF_4? [3]

OR

(a) Although both CO_2 and H_2O are triatomic molecules, the shape of H_2O molecule is bent while that of CO_2 is linear. Explain on the basis of dipole moment.

(b) Write the significance of dipole moment.

15. The drain cleaner contains small bits of aluminium which react with caustic soda to produce dihydrogen gas. What volume of dihydrogen at 20°C and one bar pressure will be released when 0.15 g of aluminium reacts. [3]

16.

(a) What is spontaneous process? [3]

(b) Predict in which of the following, entropy increases/decreases.

i) A liquid crystallises into a solid.

ii) Temperature of crystallise solid is raised from 0 K to 115 K

iii) $2NaHCO_{3(s)} \rightarrow Na_2CO_3 + CO_{2(g)} + H_2O_{(g)}$

iv) $H_{2(g)} \rightarrow 2H_{(g)}$

17.

(a) Write the expression for equilibrium constant for the reaction: [3]

$$H_{2(g)} + I_{2(s)} \rightleftharpoons 2HI_{(g)}$$

(b) Calculate the pH of a buffer solution containing 0.2 mole of NH_4Cl and 0.1 mole of NH_4OH per litre. (Given K_b for $NH_4OH = 1.85 \times 10^{-5}$)

OR

Consider the reaction:

$2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)+189.4\,kJ$.

Indicate the direction in which the equilibrium with shift when:

(a) Temperature is increased

(b) Pressure is increased

(c) Concentration of SO_2 is increase

18. Balance $P + HNO_3 \longrightarrow H_3PO_4 + NO_2 + H_2O$ by oxidation number method. [3]

OR

Write the half reactions for each of the following redox reactions:

(a) $Zn_{(s)} \rightarrow PbCl_{2(aq)} + Pb_{(s)} + ZnCl_{2(aq)}$

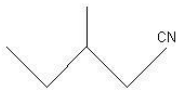
(b) $2Fe^{3+}_{(aq)} + 2I^-_{(aq)} \rightarrow I_{2(aq)} + 2Fe^{2+}_{(aq)}$

(c) $2Na_{(s)} + Cl_{2(g)} \rightarrow 2NaCl_{(s)}$

19. What do you understand by the term 'non-stoichiometric hydrides? Do you expect this this type of hydrides to be formed by alkali metals? Justify. [3]

20. [3]

(a)



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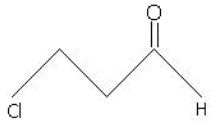

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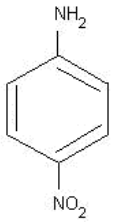


21. [3]

(a) Arrange the following carbanions in the increasing order of their stability

$(CH_3)_3\bar{C}$, $CH_3\bar{C}H_2$, $\bar{C}H_3$, $(CH_3)_2\bar{C}H$

(b) What is the hybridisation of the negatively charged carbon atom in a carbanion?

22. Explain. [3]

(a) Alkali metals are prepared by electrolysis of their fused chlorides.

(b) Why are lithium salts commonly hydrated and those of other alkali metal ions usually anhydrous?

23. Calculate the molarity of a solution of ethanol in water in which the mole fraction of ethanol is 0.040. [3]

24. Complete the following chemical equations: [3]

(a) $Z + 3LiAlH_4 \rightarrow X + 3LiF + 3AlF_3$

(b) $X + 6H_2O \rightarrow Y + 6H_2$

(c) $3X + 3O_2 \xrightarrow{\Delta} B_2O + 3H_2O$

Section D

25. For the reaction [5]

$NH_4Cl(s) \longrightarrow NH_3(g) + HCl(g)$

At 25°C, enthalpy change, $\Delta H = +177\ kJ\,mol^{-1}$

Entropy change $\Delta S = +285 JK^{-1}\,mol^{-1}$.

Calculate free energy change ΔG at 25°C and predict whether the reaction is spontaneous or not.

OR

Calculate the enthalpy of formation of benzene, using the following data

$$C_6H_{6(l)} + \frac{15}{2}O_{2(g)} \longrightarrow 6CO_{2(g)} + 3H_2O_{(l)} \quad \Delta_C H^\theta = -3266.0\,kJ$$

$$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} \quad \Delta_f H^\theta = -393.1\ kJ$$

$$H_{2(g)} + \frac{1}{2}O_{2(g)} \longrightarrow H_2O_{(l)} \quad \Delta_f H^\theta = -286.0\ kJ$$

26. Explain giving reasons for the following: [5]

(a) Boron does not form B^{3+} ions.

(b) Molten aluminium bromide is a poor conductor of electricity.

(c) BCl3 is more stable than $TlCl_3$.

(d) B-Cl bond has a dipole moment but BCl_3 has zero dipole moment.

(e) Al is used to make transmission cables.

OR

Explain the following reactions:

(a) Silicon is heated with methyl chloride at high temperature in the presence of copper powder

(b) CO is heated with ZnO

(c) Reaction of boron trifluoride with LiAlH4 in diethyl ether

(d) Reaction of boron trifluoride with sodium hydride at 450 K

(e) Reaction of diborane and water

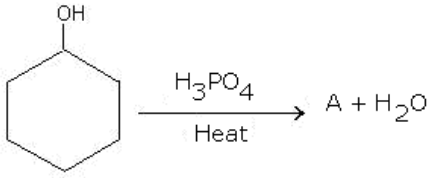
27. [5]

(a) Compound 'A' with the molecular formula C_6H_8 reacts with hydrogen in the presence of Lindlar's catalyst to form a compound B with the molecular formula C_5H_{10}. A on reacting with sodium in liquid ammonia forms a compound 'C' with the same molecular formula as that of B. Identify 'A', 'B' and 'C'. Give the chemical reactions involved.

(b) Write the chemical reaction involved in Kolbe's electrolytic process. What are the products formed at cathode and anode?

OR

(a) Complete the reactions and identify A, B and C.



$$CH_3CH = CH_2 + HBr \longrightarrow B$$
$$\downarrow (i)\ O_3\ (ii)\ Zn/H_2O$$
$$C \quad + \quad HCHO$$

(b)

$$CaC_2 + H_2O \rightarrow Ca(OH)_2 + E$$

CBSE
Class XI Chemistry
Sample Paper – 1 Solution

Section A

1. This is because o – nitro phenol has intramolecular hydrogen bonding whereas p- nitro phenol has intermolecular hydrogen bonding.

OR

$O_2NCH_2CH_2O^-$ will be more stable because $-NO_2$ group has electron withdrawing inductive effect or – I effect.

2. CO_2 has a larger bond angle than BF_3. This is because CO_2 has a linear shape and the bond angle is 180^o, BF_3 on the other hand has a trigonal planar geometry and hence the bond angle is 120^o.

OR

Bond order of N_2 is greater than that of O_2. Higher is the bond order greater is the stability. Therefore N_2 is more stable than O_2.

3. The eclipsed conformation of propane is less stable and has more energy than the eclipsed conformation of ethane. This is because in propane there are additional interactions between C-H and C-C bond of methyl group.

4. In Antarctica, ozone depletion is due to the formation of chlorine nitrate.

5. Alkali metals have low ionization energies. They can lose electrons when light falls on them, and hence are used in photo electric cells.

Section B

6. Statement 'a' is correct and b is incorrect.
Statement 'b' is incorrect because d sub shell can have a maximum of 10 electrons. Therefore it has 10 columns and not 8.

7. Elements in which transition of electrons to higher energy d-orbital cannot take place are not transition elements. Thus, elements like Zn, Cd and Hg in which all the d-orbitals are completely filled are not transition elements although they have been grouped with d-block.

8. Given:

$\lambda = 456\,\text{nm}$

$= 456 \times 10^{-9}\ \text{m}$

$c = 3 \times 10^{8}\,\text{m/s}$

We have,

$\nu = \frac{c}{\lambda}$

$= \frac{3 \times 10^{8}}{456 \times 10^{-9}}$

$\nu = 6.5 \times 10^{14}\ \text{s}^{-1}$

$\nu = 6.5 \times 10^{14}\ \text{Hz}$

Frequency is 6.5×10^{14} Hz

9. Oxidation number of Pb in PbO is +2 while in PbO_2 it is +4. This causes the compounds to differ in their reactivity. While PbO reacts with HCl to give acid-base reaction, and PbO_2 reacts with HCl to give redox reaction.

$2PbO + 4HCl \rightarrow 2PbCl_2 + 2H_2O$ (acid-base reaction)

$PbO_2 + 4HCl \rightarrow PbCl_2 + Cl_2 + 2H_2O$ (redox reaction)

10.

$2H_2O + 2F_2 \longrightarrow 4HF + O_2$

F_2 is the oxidizing agent and H_2O is reducing agent.

H_2O is getting oxidized to O_2 whereas F_2 is getting reduced to F^- ion.

OR

(a) $PbS_{(g)} + H_2O_{2(aq)} \rightarrow PbSO_{4(s)} + 4H_2O_{(l)}$

(b) $CO_{(g)} + 2\,H_{2(g)} \xrightarrow[\text{catalyst}]{\text{Cobalt}} CH_3OH$

11. The energy required to excite outer electrons in the atoms of Be and Mg does not lie in the visible range of radiation. Therefore, no absorption of radiation takes place and hence no colour is imparted to the flame in the flame test.

12.

$$\text{Mass \% of an element} = \frac{\text{Mass of element in that compound}}{\text{Molar mass of the compound}} \times 100$$

$$\text{Molar mass of } Na_2SO_4 = 2(23) + 32 + 4(16)$$
$$= 142\,g/mol$$

$$\text{Mass \% of Na} = \frac{46}{142} \times 100$$

$$= 32.39\%$$

$$\text{Mass \% of S} = \frac{32}{142} \times 100$$

$$= 22.54\%$$

$$\text{Mass \% of O} = \frac{64}{142} \times 100$$

$$= 45.07\%$$

OR

Given:
Weight of $CuSO_4$ =100 g
Atomic mass of Cu – 63.5 amu

1 mole of $CuSO_4$ contains 1 mole of Cu
Molar mass of $CuSO_4$ = 63.5 + 32+ (4×16)
= 159.5 g/mol

So, Cu that can be obtained from 159.5 g of $CuSO_4$ = 63.5 g

Therefore, Cu that can be obtained from 100 g of $CuSO_4$

$$= \frac{63.5}{159.5} \times 100$$

$$= 39.81\,g$$

13.

(a) The 4f sub shell of an atom contains 12 electrons

$4f^{12}$

↑↓	↑↓	↑↓	↑↓	↑↓	↑	↑

So maximum 7 electrons will have same spin.

(b) Six electrons are filled in three orbitals of 4p subshell.

$4p^6$

↑↓	↑↓	↑↓

(c) Z =29

Electronic configuration $1s^2\ 2s^2 2p^6 3s^2 3p^6\ 3d^{10}\ 4s^1$

OR

(a) Number of electrons in 1 molecule of methane = 6 + 4 =10 electrons

Number of molecules in 1 mole of methane

$= 6.022 \times 10^{23}$ molecules of methane

Number of electrons in 1 mole of methane

$= 6.022 \times 10^{23} \times 10$

$= 6.022 \times 10^{24}$ electrons

(b) n = 3

$l = 0\ to\ (n\text{-}1)$

$= 0,1,2$

For $l = 0$,

$m_l = 0$

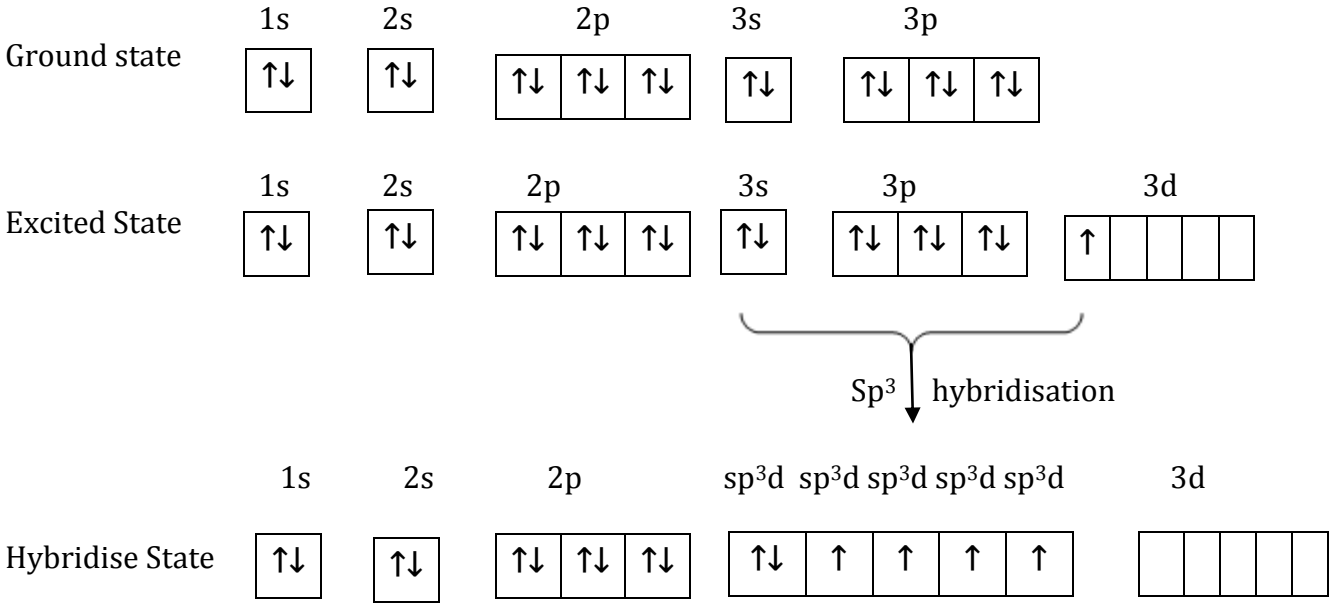
For $l = 1$

$m_l = -1, 0, +1$

For $l = 2$

$m_l = -2, -1, 0, +1, +2$

14. The electronic configuration of $S=1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$



Sulphur undergoes sp^3d hybridisation.

OR

(a) In CO_2 there are two C=O bond. Each C=O bond is polar bond. The net dipole moment of CO_2 molecule is zero. This is possible only if CO_2 is a linear molecule (O=C=O). The bond dipoles of two C=O bond cancel with each other.
Whereas H_2O molecule has a net dipole moment (1.84 D) H_2O molecule has a bent structure because here the O-H bonds are oriented at an angle of 104.5° and do not cancel the bond moments of each other.

(b) Significance/applications of dipole moment-

i) In predicting the nature of the molecules: Molecules with specific dipole moments are polar in nature and those of zero dipole moments are non-polar in nature.
ii) In the determination of shapes of molecules.
iii) In calculating the percentage ionic character.

15.

$$2Al + 2NaOH + 2H_2O \longrightarrow 2NaAlO_2 + 3H_2$$

2×27 $3 \times 22.4\,L$

$54\,g$

$54\,g$ of Al give $H_2 = 3 \times 22.4$ L

$0.15\,g$ of Al gives $H_2 = \frac{3 \times 22.4}{54} \times 0.15$

$= 0.1867$ L

$= 186.7\,ml$

$V_1 = 186.7\,ml$ $V_2 = ?$

$T_1 = 273K$ $T_2 = (20°C + 273)K = 293K$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$V_2 = \frac{186.7 \times 293}{273}$$

$= 200.3\,ml$

Volume of dihydrogen is 200.3 ml

16.

(a) A process is said to be spontaneous if it takes place by itself by own or under some condition.

(b)

i) After freezing, the molecules attain an ordered state and therefore, entropy decreases.

ii) At 0 K the constituent particles are in static form therefore entropy is minimum. If the temperature is raised to 115 K particles begin to move and entropy increases.

iii) Reactant $NaHCO_3$ is solid. Thus entropy is less in comparison to product which has high entropy.

17.

(a)

$$K = \frac{[HI]^2}{[H_2]}$$

(b) According to Henderson's equation,

$$pOH = pK_b + \log \frac{[salt]}{[base]}$$

$$\text{Also, } pK_b = (-\log K_b)$$

$$= (-\log 1.85 \times 10^{-5})$$

$$= 4.733$$

$$pOH = 4.733 + \log \frac{0.2}{0.1}$$

$$= 4.733 + 0.3010$$

$$= 5.034$$

$$pH = 14 - pOH$$

$$= 14 - 5.034$$

$$= 8.966$$

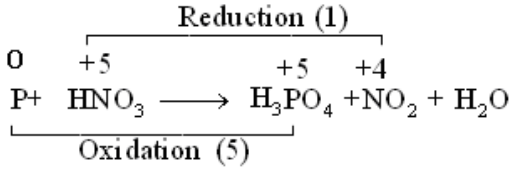
OR

(a) The equilibrium will shift the backward direction as the increase in temperature will be compensated by absorbing heat. It is an exothermic reaction.

(b) The equilibrium will shift in the forward direction since the reaction will shift to the direction of lesser number of moles.

(c) The equilibrium will shift in the forward direction so that additional SO_2 is used up.

18.



$$P + 5\,HNO_3 \longrightarrow H_3PO_4 + 5\,NO_2 + H_2O$$

O = 15 O =15

H = 5 H = 5

Oxygen and Hydrogen atoms are balanced.

OR

(a) $Zn_{(s)} \rightarrow Zn^{2+} + 2e^-$

$Pb^{2+}_{(aq)} + 2e^- \rightarrow Pb_{(s)}$

(b) $2I^-_{(aq)} \rightarrow I_{2(aq)} + 2e^-$

$2Fe^{3+}_{(aq)} + 2e^- \rightarrow 2Fe^{2+}$

(c) $2Na_{(s)} \rightarrow 2Na_{(aq)} + 2e^-$

$Cl_{2(g)} + 2e^- \rightarrow 2Cl^-$

19. Those hydrides which do not have fix composition are called non-stoichiometric hydride, and the composition varies with temperature and pressure.
This type of hydrides are formed by d and f block elements. They cannot be formed by alkali metals because alkali metal hydrides form ionic hydrides.

20.

(a) 3 – Methylpentanenitrile
(b) 3-Chloropropanal
(c) 4- Nitroaniline

21.

(a) Order of stability

(b) $(CH_3)_3\bar{C} > (CH_3)_2\bar{C}H > CH_3\bar{C}H_2 > \bar{C}H_3$

This is because $-CH_3$ group has electron releasing inductive effect or +I effect. Due to this, electron density increases on the negatively charged carbon and hence makes it more unstable. As the number of methyl groups increases the instability increases.

(c) The negatively charged carbon atom in a carbanion is sp^3 hybridized.

22.

(a) Because the discharge potential of alkali metals is much higher than that of hydrogen, therefore when aqueous solution of any alkali metal chloride is subjected to electrolysis H_2 instead of alkali metal is produced at cathode. Therefore alkali metals are prepared by electrolysis of their fused chlorides.

(b) Due to smallest size of Li^{2+} can polarise water molecules easily than the other alkali metal ions.

23.

Given:

Mole fraction of C_2H_5OH = 0.040

We know,

$$X_{C_2H_5OH} = \frac{\text{Number of moles of } C_2H_5OH}{\text{Number of moles of } C_2H_5OH + \text{Number of moles of } H_2O}$$

Let the moles of $C_2H_5OH = x$

Density of water is 1

Weight of 1000 ml of water = volume × density

$$= 1000 \times 1 \text{ ml}$$

Molar mass of water = 18 g / mol

$$\text{No. of moles of water} = \frac{1000}{18}$$

$$= 55.55 \text{ mol}$$

$$X_{C_2H_5OH} = \frac{x}{x + 55.55}$$

$$0.04 = \frac{x}{x + 55.55}$$

$x = 0.04x + 2.22$

$X = 2.31 \text{ mol}$

$$\text{Molarity} = \frac{\text{No. of moles of ethanol}}{\text{Volume of solution in litre}}$$

Molarity = 2.31 M

Molarity of solution is 2.31 M

24.

(a) $4BF_3 + 3LiAlH_4 \rightarrow B_2H_6 + 3LiF + 3AlF_3$

(b) $B_2H_6 + 6H_2O \rightarrow 2H_3BO_3 + 6H_2$

(c) $3\ B_2H_6 + 3O_2 \xrightarrow{\Delta} B_2O + 3H_2O$

Section D

25.

$NH_4Cl(s) \longrightarrow NH_3(g) + HCl(g)$

$\Delta H = 177\ kJ\ mol^{-1}$

$\Delta S = 285 J\ K^{-1}mol^{-1} = 0.285\ kJ\ K^{-1}mol^{-1}$

$T = 25^{\circ}C = 298\ K$

$\Delta G = \Delta H - T\Delta S$

$= 177 - (298\ x\ 0.285)$

$= +92.07\ kJ\ mol^{-1}$

The reaction will be non-spontaneous.
This is because the value of ΔG is positive.

OR

$6C(s) + 3H_2(g) \longrightarrow C_6H_6(l) \qquad \Delta_f H^{\theta} = ?$

$C_6H_{6(l)} + \frac{15}{2} O_{2(g)} \longrightarrow 6\ CO_{2(g)} + 3H_2O_{(l)} \quad \Delta_C H^{\theta} = -3266.0\ kJ$ eqn (1)

$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} \qquad \Delta_f H^{\theta} = -393.1\ kJ$ eqn (2)

$H_{2(g)} + \frac{1}{2} O_{2(g)} \longrightarrow H_2O_{(l)} \qquad \Delta_f H^{\theta} = -286.0\ kJ$ eqn (3)

Multiplying equation (2) by 6 and (3) by 3, and adding, (1 x 3)

$6C(s) + 6O_2(g) + 3H_2(g) + \frac{3}{2} O_2(g) \longrightarrow 6CO_2(g) + 3H_2O(l) \qquad \Delta H^{\theta} = -3216.6\ kJ$ (1)

Subtracting eqn (4) – eqn (1)

$6C(s) + 3H_2(g) \longrightarrow C_6H_6(l) \qquad \Delta_f H^{\theta} = -3216.6 + 3266.0 = +49.4\ kJ\ mol^{-1}$

26.

(a) Boron has a very small size and has a very high sum of three ionisation enthalpies ($IE_1 + IE_2 + IE_3$). Therefore, it cannot lose its three electrons to form B^{3+} ions.

(b) $AlBr_3$ is predominantly a covalent compound. Even in molten state it does not have ions which can conduct electricity.

(c) B exhibits +3 oxidation state and can form stable BCl_3. Thallium shows +3 oxidation state as well as +1 oxidation state but +1 oxidation state is more predominant than +3 oxidation state because of inert pair effect. Therefore, $TiCl_3$ is not stable. It can form stable TiCl.

(d) BCl_3 molecule has a symmetrical trigonal planar structure in which three B-Cl bonds are oriented at an angle of 120° to one another. The three bonds lie in one plane and the dipole moments of these bonds cancel one another giving net dipole moment zero.

(e) Electrical conductivity of aluminium is twice as that of copper. On mass to mass basis, Al conducts electricity twice as Cu. Therefore, it is used in transmission cables.

OR

(a)

$$2\,CH_3Cl + Si \xrightarrow[570K]{\text{Cu powder}} (CH_3)_2SiCl_2$$

Dichlorodimethyl silicon

(b) $ZnO + CO \xrightarrow{\Delta} Zn + CO_2$

(c) $4BF_3 + LiAlH_4 \xrightarrow{\text{diethyl ether}} 2B_2H_6 + 3LiF + 3\,AlF_3$

(d) $2\ BF_3 + 6\ NaH \xrightarrow{450\,K} B_2H_6 + 6\ NaF$

(e)

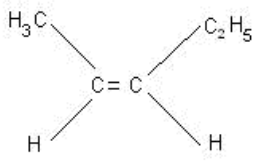
$$B_2H_6 + 6\,H_2O \longrightarrow 2\,H_3BO_3 + 6\,H_2$$

Boric acid

27.

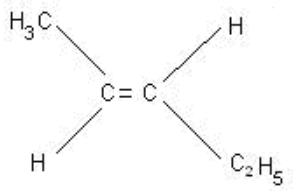
(a) Compound A is $H_3C - C \equiv C - C_2H_5$

$$\underset{A}{H_3C - C \equiv C - C_2H_5} + H_2 \xrightarrow{Pd\ /\ C}$$



cis – isomer
(B)

$$H_3C - C \equiv C - C_2H_5 + H_2 \xrightarrow{Na\ \text{in liq.}\ NH_3}$$

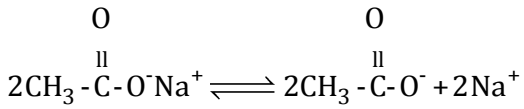


trans - isomer
(C)

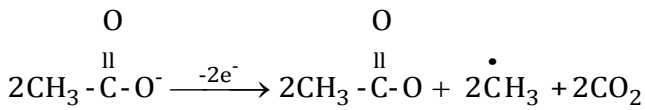
(b) <u>Kolbe's electrolytic method</u> –

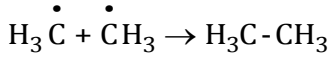
$$2\,CH_3COO^-\,Na^+ + 2H_2O \xrightarrow{\text{electrolysis}} CH_3CH_3 + 2CO_2 + H_2 + 2\,NaOH$$

Mechanism:

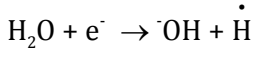


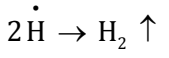
At anode:





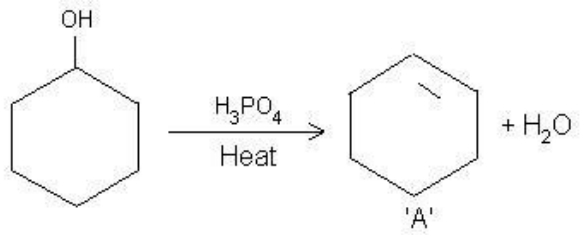
At cathode:

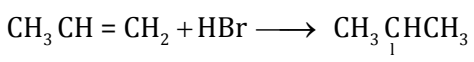




At cathode hydrogen is liberated. At anode ethane is formed.

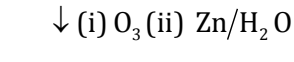
OR

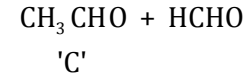




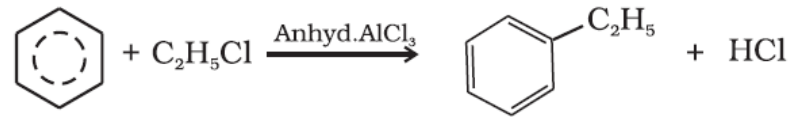
Br

'B'

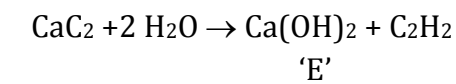




'C'



'D'



'E'