Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1

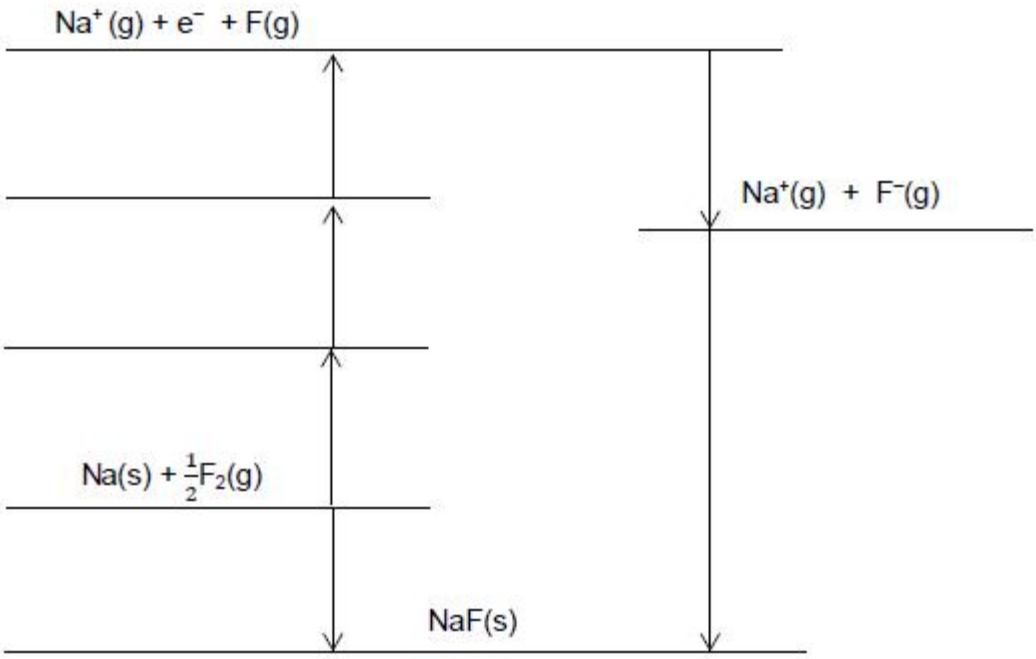
Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

This question is about sodium fluoride.

(a) Complete the Born–Haber cycle for sodium fluoride by adding the missing species on the lines.



(2)

(b) Use the data in the table and your completed Born–Haber cycle from part **(a)** to calculate the enthalpy of lattice formation of sodium fluoride.

	ΔH^θ / kJ mol^{-1}
$Na(s) \longrightarrow Na(g)$	+109
$Na(g) \longrightarrow Na^+(g) + e^-$	+494
$F_2(g) \longrightarrow 2F(g)$	+158
$F(g) + e^- \longrightarrow F^-(g)$	−348
$Na(s) + \frac{1}{2}F_2(g) \longrightarrow NaF(s)$	−569

Enthalpy of lattice formation _____ kJ mol^{-1}

(2)

Downloaded from www.merit-minds.com

(c) Suggest how the enthalpy of lattice formation of NaCl compares with that of NaF

Justify your answer.

How enthalpies of formation compare _____

_____

Justification _____

_____

_____

_____

_____

(3)

(d) Calculate the volume, in cm^3, of fluorine gas at 298 K and 100 kPa required to produce 1.00 g of sodium fluoride by reaction with an excess of sodium.

The gas constant $R = 8.31\ J^{-1}\ mol^{-1}$

Volume _____ cm^3

(4)

(Total 11 marks)

Downloaded from www.merit-minds.com

Q2.

This question is about halogenoalkanes.

(a) Chlorine atoms are formed in the upper atmosphere when ultraviolet radiation causes C–Cl bonds in chlorofluorocarbons (CFCs) to break.

Write **two** equations to show how chlorine atoms catalyse the decomposition of ozone.

1. _____

_____

2. _____

_____

(2)

(b) Chloroethane reacts with potassium hydroxide in the presence of propan-1-ol to form ethene.

State the role of potassium hydroxide and the role of propan-1-ol in the reaction.

Role of potassium hydroxide _____

Role of propan-1-ol _____

(2)

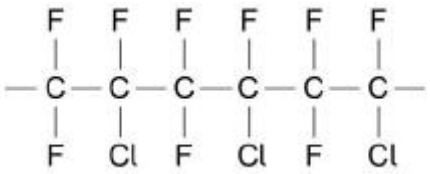
(c) Name and outline a mechanism for the reaction in part **(b)** between chloroethane and potassium hydroxide to produce ethene.

Name of mechanism _____

Mechanism

(4)

(d) The structure of polymer **A** is shown.



Draw the structure of the monomer used to form polymer **A**.

(1)

(e) Chemical analysis shows that a chlorofluoroalkane, **B**, contains by mass 51.6% fluorine,

Downloaded from www.merit-minds.com

32.1% chlorine and no hydrogen.

Chlorine exists as two isotopes, ^{35}Cl and $3^{37}Cl$, in the ratio 3:1
Fluorine only exists as one isotope, ^{19}F.

A mass spectrum of **B** is obtained using electron impact ionisation. The mass spectrum shows three molecular ion peaks at *m/z* = 220, 222 and 224.

Determine the formula of each of the three molecular ions of **B**.

Predict and explain the ratio of the relative abundancies of each of the three molecular ion peaks at *m/z* = 220, 222 and 224.

To gain full marks you must show all your working.

(6)
(Total 15 marks)

Downloaded from www.merit-minds.com