Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Chemical Equilibria, Le Chatelier's Principle And Kc

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

Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

This question is about the equilibrium mixture formed when **A** and **B** react.

$$\mathbf{A}(aq) + 2\ \mathbf{B}(aq) \rightleftharpoons \mathbf{C}(aq) \qquad \Delta H = -32\ \text{kJ mol}^{-1}$$

(a) A solution containing 0.60 mol of **A** is added to a solution containing 0.60 mol of **B**. The amount of **C** formed at equilibrium is 0.28 mol

Deduce the amounts, in moles, of **A** and **B** in this mixture at equilibrium.

Amount of **A** _____ mol

Amount of **B** _____ mol

(2)

(b) Give an expression for the equilibrium constant (K_c) for this reaction.

K_c

(1)

(c) The temperature of the equilibrium mixture is decreased.

Predict the effect, if any, on the value of K_c
Give a reason for your prediction.

Prediction _____

Reason _____

_____

_____

(3)

Downloaded from www.merit-minds.com

(d) In another mixture at equilibrium

[**A**] = 0.48 mol dm^{-3}
[**C**] = 0.62 mol dm^{-3}

For this reaction, the equilibrium constant K_c = 7.8 mol^{-2} dm^6

Calculate [**B**] at equilibrium.
Give your answer to the appropriate number of significant figures.

[**B**] _____ mol dm^{-3}

(3)

(Total 9 marks)

Downloaded from www.merit-minds.com

Q2.

Nitrogen dioxide decomposes at a high temperature.

$$2\ NO_2(g) \rightleftharpoons 2\ NO(g) + O_2(g) \qquad \Delta H = +113\ kJ\ mol^{-1}$$

(a) A 0.317 mol sample of nitrogen dioxide is placed in a sealed flask and heated at a constant temperature until equilibrium is reached.

At equilibrium, the flask contains 0.120 mol of oxygen.

Calculate the mole fraction of each substance at equilibrium.

Mole fraction of NO_2 _____

Mole fraction of NO _____

Mole fraction of O_2 _____

(3)

(b) The total pressure in the flask in part (a) is 120 kPa at equilibrium.

Calculate the partial pressure, in kPa, of NO_2

If you were unable to answer part (a) you should assume that the mole fraction of NO_2 is 0.380. This is **not** the correct answer.

Partial pressure _____ kPa

(1)

(c) The table below shows the mole fractions of the three gases in a different equilibrium mixture.

$$2\ NO_2(g) \rightleftharpoons 2\ NO(g) + O_2(g) \qquad \Delta H = +113\ kJ\ mol^{-1}$$

Gas	Mole fraction
NO_2	0.310
NO	0.460
O_2	0.230

Downloaded from www.merit-minds.com

For this equilibrium mixture, K_p = 59.7 kPa

Give an expression for K_p for this reaction.

Use your expression and the data in the table to calculate the total pressure, in kPa, in the flask.

K_p

Total pressure _____ kPa

(3)

(d) The equilibrium mixture in part (c) is compressed into a smaller volume.

Deduce the effect, if any, of this change on the equilibrium yield of oxygen and on the value of K_p

Effect on yield of oxygen _____

Effect on K_p _____

(2)

(e) The equilibrium mixture in part (c) is allowed to reach equilibrium at a lower temperature.

Explain why the equilibrium yield of oxygen decreases.

_____

_____

_____

_____

(2)

(Total 11 marks)

Downloaded from www.merit-minds.com