0 8 Methanol can be manufactured in a reversible reaction as shown by the equation.

$$CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$$
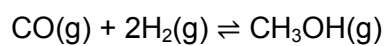
0 8 . 1 State and explain the effect of using a catalyst on the yield of methanol in this equilibrium.

[2 marks]

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0 8 . 2 Give an expression for the equilibrium constant (K_c) for this reaction.

[1 mark]

0 8 . 3 A mixture of carbon monoxide and hydrogen was allowed to reach equilibrium in a container of volume 250 cm^3 at temperature T.
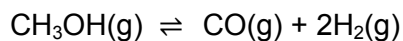At equilibrium, the mixture contained 0.340 mol of carbon monoxide, 0.190 mol of hydrogen and 0.0610 mol of methanol.

Calculate the value of the equilibrium constant (K_c) for this reaction at temperature T.

[3 marks]

K_c _____ mol^{-2} dm^6

0 8 . 4 Methanol decomposes on heating in a reaction that is the reverse of that used in its manufacture.

$$CH_3OH(g) \rightleftharpoons CO(g) + 2H_2(g)$$

Use your answer from Question **08.3** to determine the value of K_c for this equilibrium at temperature T.
State the units for this value of K_c

(If you were unable to complete the calculation in Question **08.3**, assume a value of $K_c = 0.825$ mol^{-2} dm^6. This is **not** the correct value.)

[2 marks]

Value of K_c _____

Units of K_c _____

8

Turn over ▶