Equilibrium Test

1 Consider the equilibrium: $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

What is the effect of decreasing the pressure on the position of equilibrium and the value of the equilibrium constant, K_c?

A The position of equilibrium shifts to the right and K_c increases

B The position of equilibrium shifts to the left and K_c decreases

C The position of equilibrium is unchanged and K_c does not change

D The position of equilibrium shifts to the left and K_c stays the same

2 Consider the equilibrium

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \Delta H = -92 \text{ kJ mol}^{-1}$

What is the effect of increasing the temperature on the position of equilibrium and the value of the equilibrium constant, K_c?

A The position of equilibrium shifts to the right and K_c increases

B The position of equilibrium shifts to the left and K_c decreases

C The position of equilibrium is unchanged and K_c does not change

D The position of equilibrium shifts to the left and K_c stays the same

3 Explain what is meant by the term *dynamic equilibrium*. [2]

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4 $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \Delta H = -92 \text{ kJ mol}^{-1}$

State and explain the effect of introducing an iron catalyst on the position of equilibrium and the value of the equilibrium constant, K_c? [3]

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5 Consider the reversible reaction $A(g) + 2B(g) \rightleftharpoons 2C(g) + D(g)$

2.0 mol A and 2.0 mol of B are put in a reaction vessel of volume 5 dm^3 and allowed to come to equilibrium. At equilibrium there were 1.6 mol of A present. Calculate the value of the equilibrium constant. [3]

6 Consider the following reversible reaction at 300K

$$2A(g) + B(g) \rightleftharpoons X(g) + Z(g) \qquad K_c=25$$

A and B are introduced into a reaction vessel of volume 10 dm^3. At a certain point in time the number of moles of each species present is given in the table.

Species	Number of moles
A	0.10
B	0.30
X	0.20
Z	0.20

State and explain whether the system is at equilibrium or not. [2]

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7 Consider the reversible reaction: $A(g) + B(g) \rightleftharpoons C(g) + D(g)$ $K_c=1.20$ at 300 K

(a) 1.00 mol A, 1.00 mol of B, 2.00 mol C and 2.00 mol D were introduced into a reaction vessel of volume 1.00 dm^3 and allowed to come to equilibrium. Calculate the number of moles of A present at equilibrium. [3]

(b) Calculate the value of ΔG for this reaction at 300 K. [2]