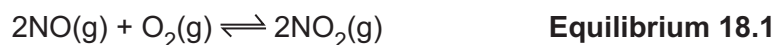


- 18 Nitrogen monoxide, NO, and oxygen, O₂, react to form nitrogen dioxide, NO₂, in the reversible reaction shown in **equilibrium 18.1**.



- (a) Write an expression for K_c for this equilibrium and state the units.

$$K_c =$$

Units =

[2]

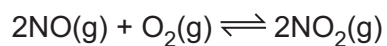
- (b) A chemist mixes together nitrogen and oxygen and pressurises the gases so that their total gas volume is 4.0 dm³.

- The mixture is allowed to reach equilibrium at constant temperature and volume.
- The equilibrium mixture contains 0.40 mol NO and 0.80 mol O₂.
- Under these conditions, the numerical value of K_c is 45.

Calculate the amount, in mol, of NO₂ in the equilibrium mixture.

amount of NO₂ = mol [4]

(c) The values of K_p for **equilibrium 18.1** at 298 K and 1000 K are shown below.



Equilibrium 18.1

Temperature / K	K_p / atm^{-1}
298	$K_p = 2.19 \times 10^{12}$
1000	$K_p = 2.03 \times 10^{-1}$

(i) Predict, with a reason, whether the forward reaction is exothermic or endothermic.

.....
 [1]

(ii) The chemist increases the pressure of the equilibrium mixture at the same temperature.

State, and explain in terms of K_p , how you would expect the equilibrium position to change.

.....

 [3]