Le-Chaterlier principle and It's application

61. (c) $N_2 + O_2 \rightleftharpoons 2NO$; $\Delta n = 0$

62 (a) Increasing the pressure

Explanation:
The reaction is **exothermic** (heat is released) and involves **a decrease in volume** (4 moles → 2 moles).
By **Le-Chatelier's Principle**, increasing **pressure** or **decreasing temperature** shifts equilibrium **toward fewer moles**, i.e., **forward**, forming more ammonia.

63 (b) Low temperature, high pressure

Explanation:
The reaction is **exothermic** (ΔH = −ve) and results in **fewer moles of gas** (3 → 2).
So, **low temperature** (favors exothermic direction) and **high pressure** (favors fewer gas molecules) both push equilibrium **forward**, forming more SO_3.

64 (c) Increasing the concentration of one or more of the products

Explanation:
According to **Le-Chatelier's Principle**, increasing the **product concentration** disturbs the equilibrium.
The system responds by shifting **backward** (toward reactants) to **reduce the excess products** — thus, the **reverse reaction is favoured**.

65. (c) High temperature and low pressure.

66. (d) High temperature and excess concentration of the reactant concentration.

67 (c) Increase in temperature

Explanation:
The reaction
$BaO_2(s) \rightleftharpoons BaO(s) + O_2(g)$; $\Delta H = +ve$
is **endothermic**, meaning **heat is absorbed** when it moves forward (producing O_2).

At equilibrium, **the pressure of O_2** depends only on **temperature**, not on the amount (mass) of the solids BaO_2 or BaO — because the **concentrations of solids remain constant**.

So, **increasing temperature** shifts the equilibrium **forward**, producing **more O_2** and thus **increasing its pressure**.

68. (c) Low temperature and high pressure.

69. (a) $H_2 + I_2 \rightleftharpoons 2HI \Rightarrow \Delta n = 2 - 2 = 0$.

70. (d) Low temperature and low pressure.

71 (a) Low pressure

Explanation:
For a gaseous reaction,
$K_p = K_c (RT)^{\Delta n}$

Here, Δn = (moles of gaseous products) − (moles of gaseous reactants)

If $K_p > K_c$, then $(RT)^{\Delta n} > 1$, so $\Delta n > 0$.
That means the number of moles increases in the forward direction.
When the number of moles increases, the reaction is favoured by **low pressure**.

Hence, forward reaction is favoured by **low pressure**.

72 (c) It occurs at high temperature

Explanation:

Since ΔH is positive, the reaction is **endothermic**.

An endothermic reaction proceeds more at **high temperature** according to Le–Chatelier's principle.

Also, the number of gas molecules on both sides is equal (2 = 2), so **pressure has no effect**.

Therefore, the reaction occurs more at **high temperature**.

73. (c) It is an exothermic reaction hence low temperature and increasing pressure will favour forward reaction