CHEMISTRY

21. (4)

$$[HI]=\frac{64\ gm}{128\times 2\,L}=0.25$$

22. (3)

$A+B \rightleftharpoons C+D$

Initial conc. 4 4 0 0

After T time conc. (4–2) (4–2) 2 2

Equilibrium constant =

$$\frac{[C]\,[D]}{[A]\,[B]}=\frac{2\times 2}{2\times 2}=1$$

23. (3)

Equilibrium constant is independent of original concentration of reactant.

24. (2)

$A + 2B \rightleftharpoons C + 3D$

$$K=\frac{[pC]\,[pD]^3}{[pA]\,[pB]^2}$$

$$=\frac{0.30\times 0.50\times 0.50\times 0.50}{0.20\times 0.10\times 0.10}=18.75$$

25. (3)

26. (1)

$H_2 + I_2 \rightleftharpoons 2HI$

Initial conc. 4.5 4.5 0

x x 2x

from question 2x = 3

$$x=\frac{3}{2}=1.5$$

So conc. at eqm. $4.5-1.5$ of H_2

$=4.5-1.5$ of I_2 and 3 of HI

$$K=\frac{[HI]^2}{[I_2]\,[H_2]}=\frac{3\times 3}{3\times 3}=1.$$

27. (1)

$$K_p=\frac{[P_{CO}]^2[P_{O_2}]}{[P_{CO_2}]^2}=\frac{[0.4]^2\times[0.2]}{[0.6]^2}=0.0888$$

28. (4)

$K_f=1.1\times10^{-2}$; $K_b=1.5\times10^{-3}$

$$K_c=\frac{K_f}{K_b}=\frac{1.1\times10^{-2}}{1.5\times10^{-3}}=7.33.$$

29. (1)

$$\underset{50}{\overset{100}{2HI}} \rightleftharpoons \underset{25}{\overset{0}{H_2}} + \underset{25}{\overset{0}{I_2}}$$

$$\frac{[H_2]\,[I_2]}{[HI]^2}=\frac{25\times 25}{50\times 50}=0.25.$$

30. (3)

$N_2+3H_2 \rightleftharpoons 2NH_3$ ….. (i)

at $t=0$ 56 gm 8gm 0gm

= 2mole 4mole 0mole

at equilibrium $2-1$ $4-3$ 34gm

$=1$ mole $=1$ mole $=2$ mole

According to eq. (i) 2 mole of ammonia are present and to produce 2 mole of NH_3, we need 1 mole of N_2 and 3 mole of H_2 hence $2-1=1$ mole of N_2 and $4-3=1$ mole of H_2 are present at equilibrium in vessel.