

NEET ANSWER KEY & SOLUTIONS

SUBJECT :- CHEMISTRY

CLASS :- 11th

PAPER CODE :- CWT-6

CHAPTER :- CHEMICAL EQUILIBRIUM

ANSWER KEY

1. (A)	2. (D)	3. (A)	4. (B)	5. (B)	6. (C)	7. (A)
8. (A)	9. (C)	10. (D)	11. (C)	12. (B)	13. (A)	14. (B)
15. (A)	16. (C)	17. (B)	18. (C)	19. (A)	20. (D)	21. (C)
22. (B)	23. (A)	24. (A)	25. (A)	26. (A)	27. (B)	28. (A)
29. (B)	30. (A)	31. (A)	32. (D)	33. (B)	34. (B)	35. (D)
36. (A)	37. (A)	38. (B)	39. (A)	40. (D)	41. (B)	42. (B)
43. (D)	44. (D)	45. (B)	46. (B)	47. (B)	48. (D)	49. (A)
50. (A)						

SOLUTIONS

SECTION-A

1. (A)
Sol. At equilibrium all properties solution (i.e. chemical composition of eq. mixture) becomes constant.

2. (D)
Sol. At equilibrium rates of backward and forward reactions become equal.

3. (A)

4. (B)

Sol. Molar conc. = $\frac{\text{no. of molar (mole) } O_2}{\text{volume (in l litre)}}$
 $= \frac{869}{329} \times 2 = 1.5 \text{ mol/litre}$

5. (B)

Sol. Forward reaction rate (r_f) $[A] [B] = K_1 [A] [B]$
 Backward reaction rate (r_b) $= K_2 [C] [D] = K_2 [C] [D]$
 At equilibrium, $r_f = r_b$
 $\therefore K_1 [A] [B] = K_2 [C] [D]$

The concentration of reactants & products at equilibrium are related by

$$K = \frac{K_1}{K_2} = \frac{[C] [D]}{[A] [B]}$$

$$\therefore K(K_c) = \frac{K_1}{K_2}$$

6. (C)

Sol. $K_C = \frac{[Z]^2}{[X]^2 [Y]^2}$

7. (A)

Sol. $N_2 + O_2 \rightleftharpoons 2NO$
 $K_p = \frac{P_{NO}^2}{P_{N_2} \cdot P_{O_2}} \dots (i)$

$2NO \rightleftharpoons N_2 + O_2$
 $K'_p = \frac{P_{N_2} \cdot P_{O_2}}{P_{NO}^2} \dots (ii)$

From equation (i) and (ii), we have

8. (A)

Sol. $K_1 = \frac{(SO_3)}{(SO_2)(O_2)^{1/2}}$
 $K_2 = \frac{(SO_2)^4 (O_2)^2}{(SO_3)^4} = \frac{1}{(K_1)^4}$
 $\Rightarrow K_2 = \frac{1}{(K_1)^4}$

9. (C)

Sol. Equilibrium const. is temp. dependent only.

10. (D)

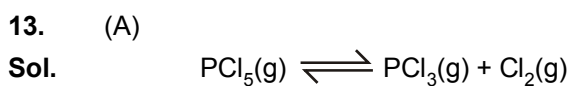
Sol. $N_2O_{(g)} \rightleftharpoons 2NO_{2(g)}$
 $\Delta n = 2 - 1 = 1, K_p = K_c \text{ (given)}$
 We know, $K_p = K_c (RT)^{\Delta n}$
 $1 = RT, T = \frac{1}{.0821} = 12.19 \text{ K}$

11. (C)

Sol. for $K_p = K_c, \Delta n = 0$
 only option (C) with satisfy this condition.

12. (B)

Sol. For this reaction, $K_C = \frac{[X]^4 [Y]^6}{[A]^4 [B]^5}$
 So the unit of $K_C = \left[\frac{\text{mole}}{\text{litre}} \right]^{(4+6)-(4+5)} = \text{mole litre}^{-1}$



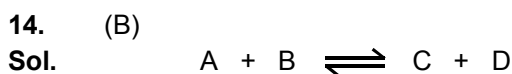
$$\begin{array}{cccc} t=0 & 1 & 0 & 0 \\ t=t_{\text{eq}} & 1-x & x & x \end{array}$$

Total moles = $1+x$

Given $\frac{1-x}{1+x} = 0.4$

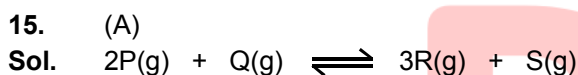
$$x = \frac{3}{7}$$

$$x_{\text{PCl}_3} = \frac{\frac{3}{7}}{1 + \frac{3}{7}} = 0.3.$$



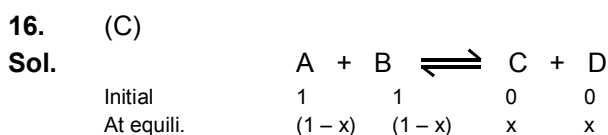
$$\begin{array}{cccc} t=0 & 4 & 4 & 0 & 0 \\ t=t_{\text{eq}} & 4-2 & 4-2 & 2 & 2 \end{array}$$

$$K_c = \frac{2 \times 2}{2 \times 2} = 1$$



$$\begin{array}{cccc} t=0 & 2 & 2 & 0 \\ x/2 & & & \\ t=t_{\text{eq}} & 2-x & 2-x/2 & 3/2 x \\ x/2 & & & \end{array}$$

from above, at equilibrium $2-x < 2-x/2$
 $\therefore [\text{P}] < [\text{Q}]$ at equilibrium



$$\therefore K_c = \frac{[\text{C}][\text{D}]}{[\text{A}][\text{B}]} = 9$$

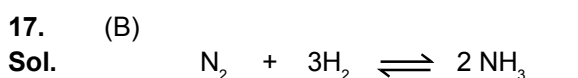
$$\therefore \frac{x \cdot x}{(1-x)^2} = 9$$

or $x^2 = 9 + 9x^2 - 18x$

or $8x^2 - 18x + 9 = 0$

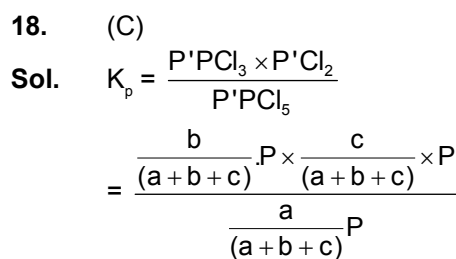
$$\therefore x = \frac{3}{2} \text{ or } \frac{3}{4}$$

Hence, among the given options, the option (C) i.e., 0.75 is correct.

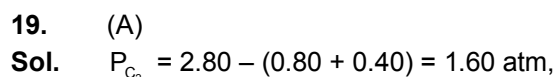


$$\begin{array}{cccc} t=0 & 1 \text{ mole} & 2 \text{ mole} & 0 \\ t=t_{\text{eq}} & 1-x & 2-3x & 2x = 0.8 \text{ } x = 0.4 \end{array}$$

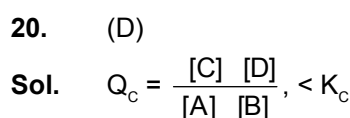
mole of $\text{N}_2 = 0.6$
mole of $\text{H}_2 = 0.8$



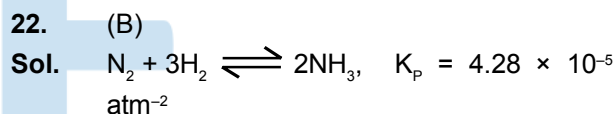
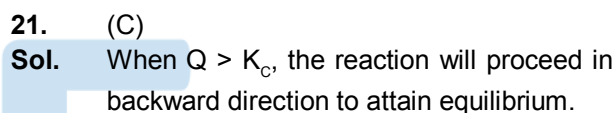
$$K_p = \frac{bc \cdot P}{a(a+b+c)}$$



$$K_p = \frac{P_{\text{C}_2}^2}{P_{\text{A}_2} \times P_{\text{B}_2}} = \frac{(1.60)^2}{0.80 \times (0.40)^3} = 50$$



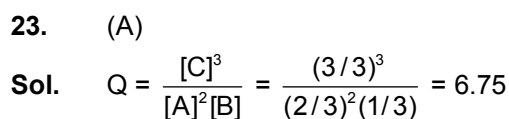
$\therefore Q_c$ with time



Reaction Quotient, $Q_p = \frac{P_{\text{NH}_3}^2}{P_{\text{N}_2} (P_{\text{H}_2})^3} =$

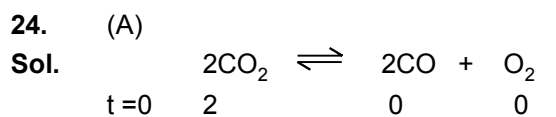
$$\frac{3^2}{1 \times (2)^3} = \frac{9}{8}$$

$Q_p > K_p, \therefore$ Reaction will go Backward.



$Q < K_c$

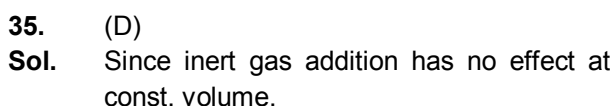
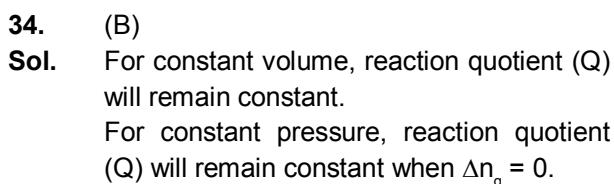
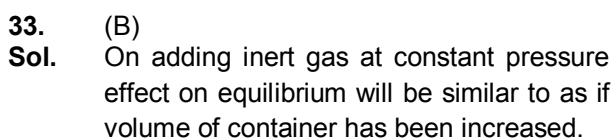
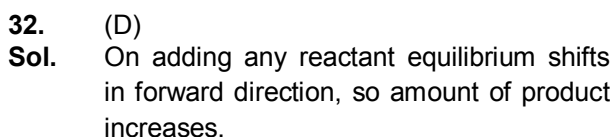
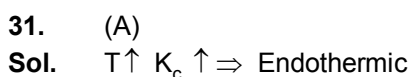
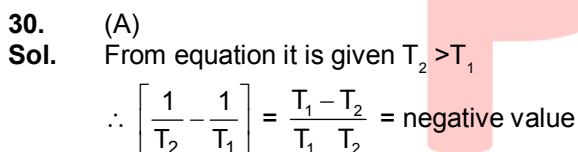
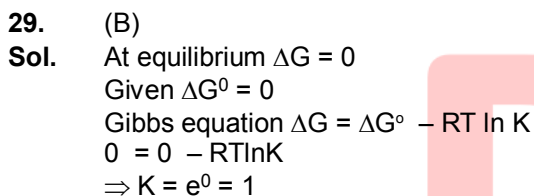
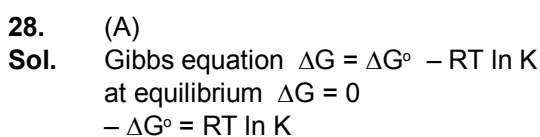
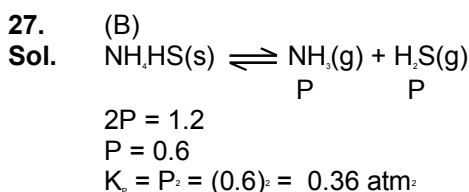
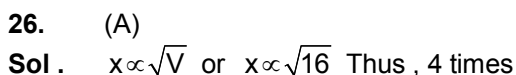
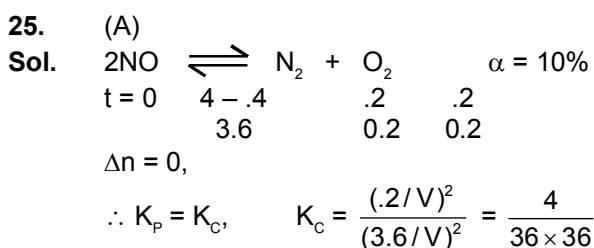
The reaction will proceed in forward direction to attain equilibrium.



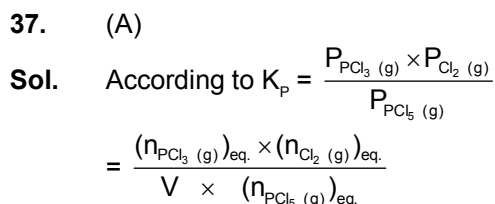
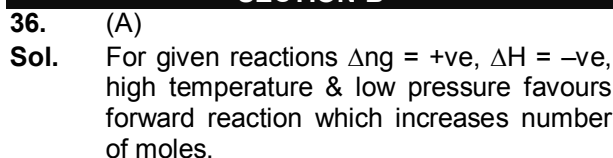
Total moles at equilibrium = $n_{\text{CO}_2} + n_{\text{O}_2} +$

n_{CO}

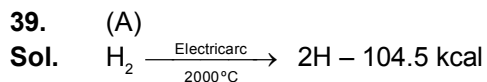
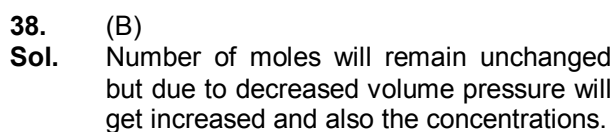
$$= 2 - 2 \times \frac{40}{100} + 2 \times \frac{40}{100} + \frac{40}{100} = 2.4$$



SECTION-B



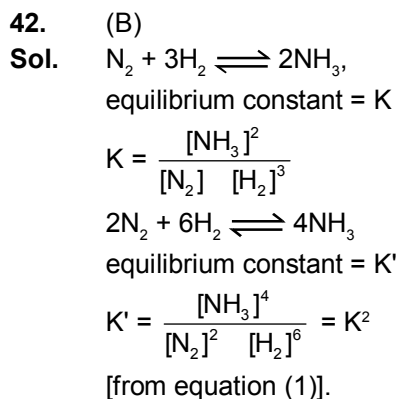
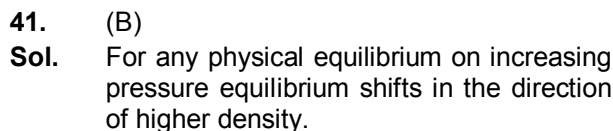
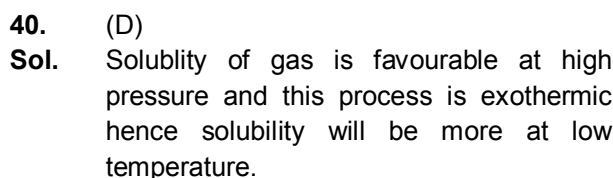
and on adding inert gas at constant pressure effect on equilibrium will be similar to as if volume of container has been increased.



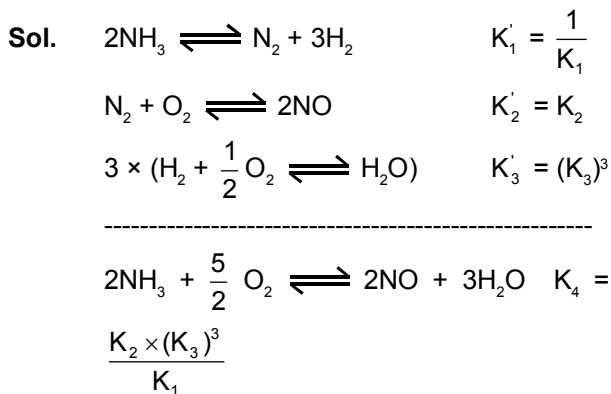
hydrogen molecule

atomic hydrogen

The reaction is endothermic. For endothermic reaction increase in temperature shift the equilibrium in forward direction. To proceed forward the pressure must be low because for the above reaction, increase of pressure will favoured backward reaction. So, for maximum yield the conditions are high temperature and low pressure.



43. (D)



44. (D)

Sol. For pure solids & pure liquids, although they have their own active masses but they remain const, during a chemical change.

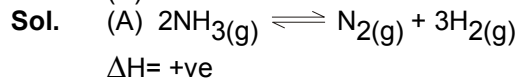
K_c & K_p are equilibrium const. in terms of concentration & partial pressures.

All options are correct.

45. (B)

Sol. $VD_{\text{Minor obs}} = \frac{D}{1 \times (n-1)d}$
 $VD_{\text{obs}} = 62, VD_{\text{TH}^2} = 104.16, n = 2$
 $\alpha = 68\%$

46. (B)



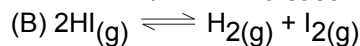
on P increase \Rightarrow backward

on T increase \Rightarrow forward

on V increase \Rightarrow forward

on addition of inert gas at constant

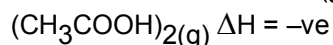
P \Rightarrow V will increase = forward



$\Delta H = +ve$

on P increase or V increase \Rightarrow no effect

on T increase \Rightarrow forward



on P increase \Rightarrow forward

on T increase \Rightarrow backward

on V increase \Rightarrow backward

on introduction of inert gas at constant pressure \Rightarrow volume will increase = backward

47. (B)

Sol. By definitions.

48. (D)

Sol. Value of equilibrium constant is not dependent on concentration of any species.

49. (A)

50. (A)