# NEET ANSWER KEY & SOLUTION

PAPER CODE :- PART TEST-4 CLASS-XI													
								7					
ANSWOR KEY													
1.	$(\mathbf{C})$	2.	(B)	3.	(A)	4.	(C)	5.	$(\mathbf{D})$	6.	$(\mathbf{C})$	7.	(B)
8.	(D)	<u>-</u> . 9.	(A)	10.	(A)	11.	(D)	12.	(B)	13.	(e) (A)	14.	(C)
15.	(D)	16.	(A)	17.	(C)	18.	(B)	19.	(B)	20.	(D)	21.	(B)
22.	(A)	23.	(A)	24.	(B)	25.	(B)	26.	(D)	27.	(D)	28.	(B)
29.	(C)	30.	(A)	31.	(C)	32.	(A)	33.	(D)	34.	(A)	35.	(C)
36.	(A)	37.	(C)	38.	(A)	39.	(B)	40.	(A)	41.	(C)	42.	(B)
43.	(A)	44.	(C)	45.	(B)	46.	(B)	47.	(D)	48.	(A)	49.	(B)
50.	(C)												
						CHEM	IISTRY						
51.	(D)	52.	(A)	53.	(D)	54.	(D)	55.	(B)	56.	(A)	57.	(C)
58.	(A)	59.	(A)	60.	(A)	61.	(C)	62.	(A)	63.	(A)	64.	(D)
65.	(C)	66.	(A)	67.	(C)	68.	(C)	69.	(D)	70.	(D)	71.	(C)
72.	(D)	73.	(C)	74.	(B)	75.	(A)	76.	(A)	77.	(C)	78.	(A)
79.	(A)	80.	(A)	81.	(B)	82.	(A)	83.	(B)	84.	(B)	85.	(B)
86.	(C)	87.	(B)	88.	(C)	89.	(B)	90.	(D)	91.	(D)	92.	(C)
93.	(C)	94.	(C)	95.	(B)	96.	(A)	97.	(D)	98.	(C)	99.	(B)
100.	(A)												
						DIOI	OCV						
101	<b>(B)</b>	102	$(\mathbf{R})$	103	<b>(B)</b>	104		105	$(\mathbf{C})$	106	$(\mathbf{C})$	107	( <b>B</b> )
101.	(D)	102.	(D)	103.	(D)	104.	$(\mathbf{A})$	103.	$(\mathbf{C})$	113	$(\mathbf{C})$	107.	(D)
115	(D) (B)	116	(D) (C)	117	$(\mathbf{D})$	111.	(A) (D)	112.	(A) (B)	120	$(\mathbf{C})$	121	(D)
122	(D)	123	$(\mathbf{C})$	124	(C) (B)	125	(B)	126	(B)	120.	$(\mathbf{C})$	121.	(D)
129.	(D) (A)	130.	(C) (B)	131.	(D)	132.	(A)	133.	(C)	134.	(R)	135.	(D)
136.	(R)	137.	(C)	138.	(B)	139.	(A)	140.	(B)	141.	(A)	142.	(C)
143.	$(\mathbf{C})$	144.	(B)	145.	(C)	146.	(B)	147.	(A)	148.	(D)	149.	(e) (A)
150.	(e) (A)	151.	(A)	152.	(B)	153.	(C)	154.	(D)	155.	(B)	156.	(C)
157.	(A)	158.	(D)	159.	(B)	160.	(B)	161.	(B)	162.	(B)	163.	(C)
164.	(D)	165.	(B)	166.	(C)	167.	(-)	168.	(D)	169.	(-)	170.	(B)
171.	(D)	172.	(C)	173.	(C)	174.	(B)	175.	(C)	176.	(B)	177.	(A)
178.	(C)	179.	(D)	180.	(C)	181.	(B)	182.	(C)	183.	(C)	184.	(D)
185.	(C)	186.	(C)	187.	(D)	188.	(D)	189.	(B)	190.	(B)	191.	(A)
192.	(B)	193.	(A)	194.	(D)	195.	(C)	196.	(C)	197.	(D)	198.	(B)
199.	(C)	200.	(C)		. /		. /		. /		. /		. ,

#### SOLUTIONS

# PHYSICS

#### **1.** (C)

Sol. Pyrometer can measure temperature from  $800^{\circ}C$  to  $6000^{\circ}C$ . Hence temperature of sun is measured with pyrometer.

- Sol. Thermoelectric thermometer is based on Seeback Effect.
- **3.** (A)

**Sol.** 
$$\frac{C}{5} = \frac{F-32}{9} \implies \frac{t}{5} = \frac{t-32}{9} \implies t = -40^{\circ}$$

- **4.** (C)
- Sol. The boiling point of mercury is  $400^{\circ}C$ . Therefore, the mercury thermometer can be used to measure the temperature upto  $360^{\circ}C$ .
- 5. (D)
- **Sol.** The work done does not characterize a thermodynamic state of matter. It gives only a specific relationship (depending on path ) between two different thermodynamic state.

6. (C)

Sol. This is the case of free expansion of gas. In free expansion  $\Delta U = 0 \implies$  Temp. remains same.

**7.** (B)

Sol. From the Ideal gas Equation  $P_1V_1 = P_2V_2$ given:- $P_1 = 5L$ ,  $P_1 = 0.8m$ ,  $P_2 = P$ ,  $V_2 = 5 + 3 = 8L$  $0.8 \times 5 = P \times (3 + 5) \Rightarrow P = 0.5m$ 

...(i)

...(ii)

8. (D)

Sol. 
$$P_{1} = \frac{\rho_{1}RT}{M_{1}}$$
$$P_{2} = \frac{\rho_{2}RT}{M_{2}}$$
by (i) and (ii)
$$\frac{\rho_{1}}{\rho_{2}} = \frac{8}{9}$$

**9.** (A)

Sol. For this we will take one of them to be constant, for if we take  $\alpha$ . Taking  $\alpha$  constant,

 $\alpha = \frac{\beta}{2}$ , therefore, after multiplying 2 to both sides  $\beta = 2\alpha = 2$ Similarly, we calculate  $\gamma$ ,

 $\alpha = \frac{\gamma}{3}$  $3\alpha = \gamma =$ 

Now we will put the above calculated values in the ratio of the three coefficients of expansions, and cancel the variable  $\alpha$ 

 $\alpha : \beta : \gamma = \alpha : 2 \alpha : 3 \alpha$  $\alpha : \beta : \gamma = 1 : 2 : 3$ 

**10.** (A)

Sol.

No. of moles 
$$n = \frac{m}{molecularweight}$$

5

32

So, from ideal gas equation PV = nRT

$$\Rightarrow$$
 PV =  $\frac{5}{32}$ RT

11. (D)

**Sol.** Latent heat is defined as the amount of heat required to change the state of a substance, while the temperature remains constant. Here, the state changes from solid to liquid, hence, it is defined as the latent heat of fusion.

#### **12.** (B)

**Sol.** The melting point of ice **decreases** when pressure increases because when pressure is increased volume is decreased and the volume of water is less than ice

#### **13.** (A)

Sol. Since, the ice block is very large, so all the poured water cools down to 0°C and the heat rejected in cooling process is taken by ice and it will melt from 0°C ice to 0°C water. Therefore, by conservation of energy if m mass of ice melts then,  $m \times L = m_w S (T_i - T_f)$   $m \times 80 = 80 \times 1 \times 30$  m = 30 gHence, amount of ice that melts is 30 g.

14. (C)

Sol. Let specific heats of A and B be Ca and Cb respectively. Also there masses are m and final temperature t=28oC Heat released by A=heat absorbed by B  $\Rightarrow$ mC<sub>a</sub>(32-t)=mC<sub>b</sub>(t-24)  $\Rightarrow \frac{C_a}{C_b} = \frac{4}{4} = 1$ 

Thus required ratio is 1:1

**<sup>2.</sup>** (B)

15. (D)
Sol. As we know that thermal capacity is given as Q = ms so Q = 40 × 0.2 cal/°C
16. (A)

**Sol.** Mechanical equivalent of heat states that the motion and heat can be interchangeably used and that work done by the motion would generate equal amount of heat only if the work is entirely converted into heat. Thus A is correct.

17. (C)

- Sol. The correct option is C  $0.49^{\circ}$ C Loss in potential energy of water = Increment in thermal energy of water  $\Rightarrow$  mgh = J × ms  $\Delta$  t  $\Rightarrow$  9.8 × 210 = 4.3 × 1000  $\therefore \Delta$ t = 0.49°C
- **18.** (B)
- Sol. Work done to raise the temperature of 100 gm water through 10°C is W = J Q =  $4.2 \times (100 \times 10^{-3} \times 1000 \times 10) = 4200$ J

**19.** (B)

**Sol.** The triple point of a substance is the temperature and pressure at which the three phases (gas, liquid, and solid) of that substance coexist in equilibrium. The temperature at triple point of water is 273.16 K.

**20.** (D)

Sol. It sis known that W = J Qputting values according to question  $\Rightarrow W = 4.2 \times 200 = 840 J$ 

**21.** (B)

- **22.** (A)
- Sol. It is known that 1kcal/gm= 4.2J/kg so converting in J/kg  $536 \frac{\text{cal}}{\text{gm}} = \frac{536 \times 4.2\text{J}}{10^{-3}\text{kg}} = 2.25 \times 10^6 \text{ j/kg}$
- 23.

Sol.



Suppose, height of liquid in each arm before rising the temperature is l. With rise in temperature,

$$l_1 = l(1 + \gamma t_1) \Rightarrow l = \frac{l_1}{1 + \gamma t_1}$$
$$l_2 = l(1 + \gamma t_2) \Rightarrow l = \frac{l_2}{1 + \gamma t_2}$$

Equating 1 from above two equation, we get

$$\frac{l_1}{1 + \gamma t_1} = \frac{l_2}{1 + \gamma t_2}$$
$$\Rightarrow l_1 + \gamma l_1 t_2 = l_2 + l_2 t_1$$
$$\Rightarrow \gamma = \frac{l_1 - l_2}{l_2 t_1 - l_1 t_2}$$

**24.** (B)

Sol. 
$$V_{av} \alpha \frac{1}{\sqrt{M_0}}$$

 $\therefore$  oxygen molecule hits the wall with smaller average speed

Sol. 
$$\Delta Q = \Delta U + \Delta W$$
;  $\Delta Q = 200 J$  and  $\Delta W = -100 J$   
 $\Rightarrow \Delta U = \Delta Q - \Delta W = 200 - (-100) = 300 J$ 

**26.** (D)

Sol. RMS velocity  $u_{rms} \propto \sqrt{T}$ If temperature is increased to 3 times  $u_{rms}$ increases by  $\sqrt{3}$  times.

Sol. 
$$\Delta U = \Delta Q = 300$$
 cal.  
 $\Delta U = \frac{300}{50} = 6$  cal.

**28.** (B)

**Sol.** Heat supplied to a gas raise its internal energy and does some work against expansion, so it is a special case of law of conservation of energy.

Sol. 
$$\Delta U = \mu C_V \Delta T = n \left(\frac{R}{\gamma - 1}\right) \Delta T$$
$$\Rightarrow \Delta U = \frac{P \Delta V}{(\gamma - 1)} = \frac{P(2V - V)}{\gamma - 1} = \frac{P(2V - V)}$$

**30.** (A)

**Sol.** In first process using  $\Delta Q = \Delta U + \Delta W$ 

 $\Rightarrow 8 \times 10^{5} = \Delta U + 6.5 \times 10^{5} \Rightarrow \Delta U = 1.5 \times 10J$ Since final and initial states are same in both process So  $\Delta U$  will be same in both process For second process using  $\Delta Q = \Delta U + \Delta W$  $\Rightarrow 10^{5} = 1.5 \times 10^{5} + \Delta W \Rightarrow \Delta W = -0.5 \times 10^{5} J$ 

**31.** (C)

**Sol.** In isothermal expansion temperature remains constant, hence no change in internal energy.

Sol.	In isothermal	process, con	npressibility	$E_{\theta} = \rho.$

**33.** (D)

**Sol.**  $PV^{\gamma}$  = constant

$$\Rightarrow \frac{P_2}{P_1} = \left(\frac{V_1}{V_2}\right)^\gamma \Rightarrow P_2 = (8)^{5/3} P_1 = 32 P_1$$

- **34.** (A)
- **Sol.** Since PV = RT and  $T = \text{constant}; \therefore PV = \text{constant}.$
- **35.** (C)
- **Sol.** In adiabatic process  $PV^{\gamma}$  = constant

$$\Rightarrow \left(\frac{RT}{V}\right) V^{\gamma} = \text{constant} \Rightarrow TV^{\gamma-1} = \text{constant}$$

**36.** (A)

- **Sol.** Work done  $= P\Delta V = P(V_2 V_1)$
- **37.** (C)

Sol. 
$$TV^{\gamma-1} = \text{constant}$$
  
 $\Rightarrow T_2 = T_1 \left(\frac{V_1}{V_2}\right)^{\gamma-1} = (273 + 18) \left(\frac{V}{V/8}\right)^{0.4} = 668 K$ 

**38.** (A) **Sol.** Adiabatic expansion produces cooling. **39.** (B) **Sol.**  $\vec{P} = M\vec{V}_{av}$ , As  $\vec{V}_{av} = 0$  (in equilibrium)

 $\vec{\mathsf{P}}_{\mathsf{av}} = 0$ 

40. (A)Sol. Equation for ideal gas is PV = RT

41. (C) Sol. Velocity of molecules depends on its temperature as  $V \propto \sqrt{T}$ .

- **42.** (B)
- **Sol.** Ideal gas equation can be written as pv = nRT

or 
$$\frac{n}{v} = \frac{p}{RT} = constant$$

So, at constant pressure and temperature, all gases, will contain equal number of molecules per unit volume.

**43.** (A)

Sol. The gases carbon-monoxide (CO) and nitrogen  $(N_2)$  are diatomic, so both have equal kinetic

energy 
$$\frac{5}{2}$$
KT, i.e.  $E_1 = E_2$ .

44.

Sol.

Sol.

- (C) When ter
- When temperature of a gas is increased then its internal energy increases.

**45.** (B)

Root mean square speed of molecules in a gas is defined as the square root of mean of squares of the speed of different molecules ie,

$$v_{rms} = \sqrt{(v_1^2 + v_2^2 + ...)/N}$$
  
or  $v_{rms} = \sqrt{\frac{3RT}{M}}$ 

(According to kinetic theory of gases) While most probable speed is the speed which maximum number of molecules in a gas have at constant temperature and is given by

$$v_{mp} = \sqrt{\frac{2RT}{M}}$$

It is obvious that  $v_{rms} > v_{mp}$ .

#### **46.** (B)

Sol. Internal energy  

$$U = \frac{f}{2}$$
 KT per molecule  
 $= \frac{f}{2}$  RT per mole  
 $U = \frac{3}{2}$  RT  $f = 3$  for mono atomic

**47.** (D)

÷.

Sol. In isothermal expansion  $T = constant \Delta U = 0 W = \Delta Q$  $\therefore$  option (D) is correct.

**48.** (A)

**Sol.** Since ice contracts on melting. When we increase pressure on the ice, it tries to resist this change according to Le-Chatellier's principle. To decrease pressure, volume of ice will be decreased. It can happen if more and more ice melts i.e. its melting point is lowered.

**49.** (B)

Sol.  $L \rightarrow M P = \text{constant } V \alpha T$ . MN T = constant Here, option B is constant **50.** (C)

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Sol. Root mean square speed of gas molecules

$$v_{\rm rms} = \sqrt{\frac{3RT}{M}}$$

Pressure exerted by ideal gas

$$P = \frac{1}{3}\rho u_{rms}^2$$
$$P = \frac{1}{3}mnu^2$$

# **51.** (D)

**Sol.** According to Le Chatelier's principle, increase in pressure shifts the equilibrium in the direction of decreasing gaseous moles.

 $H_2(g) + I_2(g) \models \square 2HI(g)$ 

because in this reaction the number of moles remains same.

#### **52.** (A)

**Sol.** Temperature is another factor which can distrub the equilibrium in a reaction. According to Le-Chatelier's principle when the temperature of the system is changed (increased or decreased) the equilibrium shifts in opposite direction in order to ne utralise the effect of change in temperature.

 $2SO_2(g) + O_2(g) \models \bigcirc 2SO_3(g);$  $\Delta H^\circ = -198 \text{ kJ}$ 

 $\therefore$  an exothermic reaction.

If the temperature of the reaction mixture be increased, the equilibrium will get shifted to the left in order to neutralise the effect of increase in temperature. Actually, backward reaction is accompained by de cr ease in temper ature o r cooling. Similar ly, when t he tempe ratur e is decreased, then the equilibrium will be shifted to the right because heat is evolved in the forward reaction.

 $2SO_2(g) + O_2(g) \models \Box 2SO_3(g)$ 

no. of moles.

2 moles 1 mole 2 moles Total moles Product sides on reactant = 2 moles side = (2 + 1) = 3 mole Since, moles will be decreased.

According to "Le-chatelier's principle." increase in pressure shifts the equilibrium in the direction of decreasing gaseous moles. So, the favourable condition for the reaction is low temperature and high pressure.  $P = mn, v_{rms}^2 = \vec{v}^2$ 

Average kinetic of a molecular

$$KE = \frac{3}{2}KT$$

(D)

Total internal energy of 1 mole of a diatomic gas

 $U = \frac{5}{2}RT$  (For 1 mole diatomic gas)

#### CHEMISTRY 53.

Sol.

The forward reaction is exothermic reverse is endothermic. At high temperature reverse reaction is favoured so that more heat is absorbed, which will nullify the effect of increase temperature.

Due to this the yield of C will be lower. The no. of moles for reverse reaction increases from 2 to 3.

# **54.** (D)

Sol. In a chemical reaction, chemical equilibrium is the state in which both reactants and product are present in concentrations which have no further tendency to change with time. Usually this state results when the forward reaction proceeds at the same rate as the reverse reaction. The reaction rates of the forward and backward are generally not zero but equal. Thus, there are no net changes in the concentrations of the reactant(s) and product(s), such a state is known as "dynamic equilibrium".

### **55.** (B)

**Sol.** The rate of the forward reaction is decreasing and that of backward reaction is increasing.

#### **56.** (A)

**Sol.** The rate of a chemical reaction is directly proportional to product of molar concentration of reactants each raised to a power equal to corresponding stoichiometric coefficient appearing in the balanced chemical equation

**Sol.**  $H_2(g) + I_2(g) \models H_2 = 2HI(g), \Delta n = 2 - 2 = 0$ Kp = 50

**58.** (A)  
**Sol.** 
$$K_p = K_c \times (RT)^0$$
  
 $K_n = K_c$ 

59.

Sol.

(A)  

$$2AB(g) \models \bigoplus A_{2}(g) + B_{2}(g)$$
at initial 2 0 0  
at eqm. (2 - 2 \alpha) 2 \alpha 2 \alpha  

$$K = \frac{[A_{2}][B_{2}]}{[AB]^{2}}$$
or, 
$$K = \frac{2\alpha \times 2\alpha}{(2 - 2\alpha)^{2}}$$
or, 
$$K = \frac{4\alpha^{2}}{4(1 - \alpha)^{2}}$$
or, 
$$\frac{\alpha}{1 - \alpha} = \sqrt{K} = \sqrt{\frac{1}{64}} = \frac{1}{8}$$
or, 
$$8\alpha = 1 - \alpha$$
or, 
$$9\alpha = 1$$
or, 
$$\alpha = 1/9 = 11\%$$

**60.** (A)

Sol. For the reaction  $aA + bB \models \square cC + dD$ The rate of forward reaction  $(R_f) \propto [A]^a [B]^b = K_f [A]^a [B]^b$ The rate of backward reaction  $(R_b) \propto [C]^c [D]^d = K_b [C]^c [D]^d$   $R_f = R_b$   $\Rightarrow K_f [A]^a [B]^b = K_b [C]^c [D]^d$  $\Rightarrow \frac{K_f}{K_b} = \frac{[C]^c [D]^d}{[A]^a [B]^b} = K$ 

K is known as equilibrium constant. While  $K_f$ and  $K_b$  are called rate constants for forward & backward reaction. Now,  $K_f = K \times K_b$ = 2.5 × 3.2 × 10<sup>-2</sup> = 8 × 10<sup>-2</sup>

61.

Sol.  

$$C(s) + CO_{2}(g) \sqcup 2CO(g)$$

$$K_{p} = \frac{(P_{co})^{2}}{P_{c}} = \frac{(4)^{2}}{2} = \frac{16}{2} = 8$$

**a D D** 

(C)

**62.** (A)

Sol.

$$2A + 3B \Box 2C$$

$$\Delta n = 2 - (2 + 3) \qquad K_p = K_c \times (RT)^{4n}$$

$$= -3 \qquad K_p = K_c \times (RT)^{-3}$$

$$\frac{K_p}{K_c} = (RT)^{-3}$$

$$2A \Box 4B$$

$$\Delta n = 4 - 2 = 2 \qquad \frac{K_p}{K_c} = (RT)^2$$

$$A + B + 2C \Box 4D$$

$$\Delta n = 4 - (1 + 1 + 2) \frac{K_p}{K_c} = (RT)^{\Delta n} = (RT)^0$$

63. (A)  
Sol. 
$$A(g)\Box \quad B(g) + C(g) + D(g)$$
Initial moles 1 0 0 0  
At.equilibrium 1-\alpha \alpha \alpha \alpha   

$$\frac{\text{Total moles}}{\text{Intial moles}} = \frac{\text{Initial vapour density initial}}{\text{vapour density at equilibrium}}$$

$$\frac{1+2\alpha}{1} = \frac{D}{d}$$
10% is dissociated  

$$\therefore \frac{1+2(0.1)}{1} = \frac{D}{50}$$
1.2×50 = D  
D = 60  
D = \frac{\text{Molecular weight}}{2}

Molecular wt. 120

#### 64.

Sol. 28

(D)

 $2SO_2(g) + O_2(g) \square 2SO_3(g) + X$  cals (i) The increase in temperature shifts the eq uilibrium in the dire ction of the endothermic reaction

(ii) In cre ase in pressure sh ift the equilibrium in the direction of decreasing gaseous moles

# **65.** (C)

**Sol.** (A)  $PCl_{3(g)} + Cl_{2(g)} \square PCl_{5(g)}$ 

No. of moles decreases in forward direction.

(B)  $N_{2(g)} + 3H_{2(g)} \Box - 2NH_{3(g)}$ 

No. of mole decreases in forward direction.

(C)  $N_{2(g)} + O_{2(g)} \square 2NO(g)$ 

No. of moles remains unchanged

(D)  $2SO_2 + O_{2(g)} \square 2SO_{3(g)}$ 

No. of moles decreases.

So, in reaction (C) the yield of the products can not be changed by applying high pressure.

**66.** (A)

**Sol.** By Le-chatilier's principle, addition of  $PCl_s$  will shift the equilibrium to the reactant side.

**67.** (C)

**Sol.**  $CaCO_3(s) \square CaO(s) + CO_2(g)$ 

 $\mathbf{K}_{\mathrm{p}} = \mathbf{P}_{\mathrm{CO}_2}$ 

 $\therefore$  Equilibrium constant depends only on CO<sub>2</sub>. So addition of CaCO<sub>3</sub> doesn't affect the equilibrium concentration of CO<sub>2</sub>.

**68.** (C)

**Sol.** When rate of forward reaction is equal to rate of backward reaction the reaction is said to be in equilibrium.

69. (D)

 $\frac{64 \ gm}{128 \times 2 \ litre} = 0.25$ Sol. [HI] =

Active mass is the concentration in moles/litre.

70. (D)

Sol. Suppose 1 mole of A and B each taken then 0.8 mole/litre of C and D each formed remaining concentration of A and B will be (1 - 0.8) = 0.2*mole/litre* each.

$$Kc = \frac{[C][D]}{[A][B]} = \frac{0.8 \times 0.8}{0.2 \times 0.2} = 16.0$$

- 71. (C)
- Sol. Equilibrium constant is independent of original concentration of reactant.
- 72. (D)
- In presence of little  $H_2SO_4$  (as catalyst) about Sol. 2/3 mole of each of  $CH_3COOH$  and  $C_2H_5OH$ react to form 2/3 mole of the product at equilibrium.
- 73. (C)
- Buffer of  $H_2CO_3$  /  $HCO_3^-$  helps maintain the Sol. pH of blood
- 74. **(B)**
- Sol. Those substance which accept the proton are called Bronsted base and which donate the proton are called Bronsted acid.
- 75. (A)
- Sol. In weak electrolyte, the degree of dissociation,  $\alpha = \sqrt{\frac{K}{C}}$ . So it increases with increasing dilution.

76. (A)

- $[OH^{-}] = 10^{-2} \text{ M}; \text{ pOH} = 2$ Sol. pH + pOH = 14; pH = 14 - pOHpH = 14 - 2 = 12
- 77. (C)
- As the solution is acidic, pH < 7. This is Sol. because [H<sup>+</sup>] from H<sub>2</sub>O cannot be neglected in comparison to  $10^{-8}$  M.

78. (A) Sol. Salt is of WAWB  $\sqrt{K_h} = \frac{h}{1-h}$  $\sqrt{6.25 \times 10^{-6}} = \frac{h}{1-h}$  $25 \times 10^{-4} = \frac{h}{1-h}$ %h = 25 × 10<sup>-2</sup> = 0.25 79. (A)

Sol. On adding small amount of acid (H<sup>+</sup>) and base (OH-), weak acid or weak base will form respectively.

80.

Sol.  $NH_3$ : The conjugate acid has one proton  $[H^+]$ more.

81. (B)

(A)

$$\alpha = \sqrt{\frac{K_a}{c}}$$
 and  $\frac{1}{c} = v$   $\alpha \propto \sqrt{v}$ 

82. (A)

Ka is the product of 1st, 2nd and 3rd Sol. *:*. ionisation constant for tribasic acid  $\mathbf{K}_{\mathbf{a}} = \mathbf{K}_{\mathbf{a}_1} \times \mathbf{K}_{\mathbf{a}_2} \times \mathbf{K}_{\mathbf{a}_3}$ 

#### 83. **(B)**

Sol.  $\therefore$  HA  $\Box$  H<sup>+</sup> + A<sup>-</sup>  $\therefore$  HA  $\sqcup$  H<sup>+</sup> + A<sup>-</sup>  $C(1-\alpha)C\alpha C\alpha$  $K_a = \frac{C^2 \alpha^2}{C(1-\alpha)} = \frac{C \alpha^2}{1-\alpha}$ 

#### 84. **(B)**

Sol. 
$$pK_w = 13.40$$
  
∴ For neutral solution  
 $pH = \frac{pK_w}{2} [pH = pOH \text{ and } pK_w = pH + pOH]$   
 $pH = \frac{13.40}{2} = 6.7$   
above 6.7 → sol is alkaline  
and below 6.7 → sol is acidic  
(B) ∴ pH = 7 is alkaline

 $\therefore -\log[OH] > 7$ 

85. (B)

Sol.

$$\therefore \text{ pOH} > 7$$
$$\therefore \text{ [OH]} < 10^{-7}$$

86. (C)  
Sol. 
$$\therefore x_1 = 10^{-5} \qquad x_2 = 10^{-3}$$
  
 $\frac{x_1 V + x_2 V}{2V} = [H^+]_{new}$   
 $\therefore [H^+]_{new} = \frac{x_1 + x_2}{2}$   
 $= \frac{10^{-5} + 10^{-3}}{2} \Box 5 \times 10^{-4}$   
 $pH = -\log[H^+]_{new}$   
 $= 4 - \log 5 = 4 - 0.6989 \Box 3.3$ 

87.	(B)					
Sol.	$\therefore pK_{b} > pK_{a}$					
	$-\log K_{b} > -\log K_{a}$					
	i.e. $= K_a > K_b$					
	∵ solution is acidic					
88.	(C)					
Sol.	$\therefore pH = \frac{1}{2} \left[ PK_{w} + PK_{a} - pK_{b} \right]$					
	$2pH = pK_w + pK_a - pK_b$					
	$\therefore pK_a - pK_b = 2pH - pK_w$					
89.	(B)					
Sol.	Cu <sup>2+</sup> reacts wtih water.					
90.	(D)					
Sol.	$\therefore$ both are salts of weak acid					
	$CH_3COONa \longrightarrow salt of CH_3 COOH$					
	$C_3H_5NaO_2 \longrightarrow salt of C_2H_5 COOH$					
	propionic acid					
91.	(D)					
	$\therefore Ag_2SO_4 \longrightarrow 2Ag^+ + SO_4^{2-}$					
Sol.	s 0					
	0 2s s					
	$K_{sn} = (2s)^2 (s) [SO_4]^{2-} = s$					
	$K_{sp} = 4s^3$					
92.	(C)					
Sol.	$NH_4OH + NH_4Cl$ is the basic buffer					
	$pH = pK_w - pK_b - log \frac{Salt}{base}$					
	$pH = 14 - pK_b - \log \frac{Salt}{base}$					
93.	(C)					
Sol.	: the NH <sub>4</sub> OH is weak base and HCl is strongc					
	acid					
	$[\text{HC1}] = 0.05 \text{ mol } \text{dm}^{-5}$					
	$\therefore$ [HCl] is L.R.					
	$NH_4OH + HCI \square NH_4CI + H_2O$					

 $NH_4Cl/NH_4OH \rightarrow Buffer formed$ 

# **94.** (C)

Sol.  $H < 3.1 \longrightarrow$  methyl red pH 0 > 4.4  $\longrightarrow$  methyl yellow In between 3.1 - 4.4  $\longrightarrow$  methyl orange

### **95.** (B)

Sol. Methyl orange is a pH indicator used in titrations because of its colour change. It changes color at the pH of the mid strength acid, it is used in titrations for acids. In a solution of pH = 3.1 it is reddish and in alkali it is yellow.

# 96. (A) Sol. $\therefore S \propto C \propto K_{sp}$

# **97.** (D)

**Sol.** Assertion is false but reason is true.  $K_c = [H_2O]^2$ , because concentration of solids is taken to be unity.

# **98.** (C)

Sol. The value of K depends on the stoichiometry of reactants and products at the point of equilibrium. For *e.g.*, if the reaction is multiplied by 2, the equilibrium constant is squared.

# **99.** (B)

**Sol.** For sparingly soluble salts, reason is not a correct explanation. Hence both assertion and reason are true but reason is not a correct explanation of assertion.

# **100.** (A)

**Sol.** Aq. solution of  $FeCl_3$  on standing produce brown ppt. Due to hydrolysis it produce ppt. of  $Fe(OH)_3$  which is of brown colour. Hence both are correct and reason is a correct explanation.