NEET ANSWER KEY & SOLUTION

PAPER CODE :- PART TEST-2
CLASS-XI

ANSWER KEY

PHYSICS

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

CHEMISTRY

51.	(A)	**52.**	(B)	**53.**	(D)	**54.**	(B)	**55.**	(C)	**56.**	(B)	**57.**	(D)
58.	(C)	**59.**	(A)	**60.**	(B)	**61.**	(D)	**62.**	(C)	**63.**	(B)	**64.**	(D)
65.	(D)	**66.**	(B)	**67.**	(C)	**68.**	(B)	**69.**	(D)	**70.**	(B)	**71.**	(D)
72.	(B)	**73.**	(D)	**74.**	(A)	**75.**	(D)	**76.**	(C)	**77.**	(D)	**78.**	(C)
79.	(A)	**80.**	(B)	**81.**	(C)	**82.**	(B)	**83.**	(D)	**84.**	(B)	**85.**	(A)
86.	(D)	**87.**	(D)	**88.**	(B)	**89.**	(A)	**90.**	(A)	**91.**	(B)	**92.**	(C)
93.	(B)	**94.**	(A)	**95.**	(A)	**96.**	(D)	**97.**	(A)	**98.**	(B)	**99.**	(D)
100.	(D)												

BIOLOGY

101.	(B)	**102.**	(B)	**103.**	(B)	**104.**	(A)	**105.**	(B)	**106.**	(A)	**107.**	(D)
108.	(A)	**109.**	(D)	**110.**	(B)	**111.**	(A)	**112.**	(D)	**113.**	(C)	**114.**	(C)
115.	(C)	**116.**	(B)	**117.**	(B)	**118.**	(B)	**119.**	(D)	**120.**	(D)	**121.**	(A)
122.	(B)	**123.**	(B)	**124.**	(C)	**125.**	(C)	**126.**	(D)	**127.**	(D)	**128.**	(A)
129.	(C)	**130.**	(D)	**131.**	(B)	**132.**	(A)	**133.**	(D)	**134.**	(D)	**135.**	(D)
136.	(D)	**137.**	(D)	**138.**	(A)	**139.**	(D)	**140.**	(B)	**141.**	(A)	**142.**	(C)
143.	(C)	**144.**	(D)	**145.**	(B)	**146.**	(A)	**147.**	(B)	**148.**	(C)	**149.**	(A)
150.	(B)	**151.**	(A)	**152.**	(C)	**153.**	(D)	**154.**	(B)	**155.**	(B)	**156.**	(D)
157.	(D)	**158.**	(B)	**159.**	(A)	**160.**	(B)	**161.**	(A)	**162.**	(A)	**163.**	(B)
164.	(B)	**165.**	(A)	**166.**	(B)	**167.**	(D)	**168.**	(C)	**169.**	(B)	**170.**	(B)
171.	(A)	**172.**	(C)	**173.**	(B)	**174.**	(A)	**175.**	(C)	**176.**	(D)	**177.**	(C)
178.	(C)	**179.**	(D)	**180.**	(D)	**181.**	(C)	**182.**	(B)	**183.**	(B)	**184.**	(C)
185.	(A)	**186.**	(D)	**187.**	(A)	**188.**	(B)	**189.**	(C)	**190.**	(D)	**191.**	(A)
192.	(C)	**193.**	(D)	**194.**	(A)	**195.**	(A)	**196.**	(A)	**197.**	(A)	**198.**	(C)
199.	(B)												
200.	(D)												

SOLUTIONS

PHYSICS

1. (D)

Sol. μ does not deend on normal reaction.

2. (C)

Sol. No displacement is there.

3. (D)

Sol. Stopping distance $S \propto u^2$. If the speed is doubled then the stopping distance will be four times.

4. (C)

Sol. $W = Fs\cos\theta \Rightarrow \cos\theta = \frac{W}{Fs} = \frac{25}{50} = \frac{1}{2} \Rightarrow$

$\theta = 60°$

5. (C)

Sol. $W = \vec{F}.\vec{s} = (5\hat{i} + 3\hat{j}).(2\hat{i} - \hat{j})$ = 10 – 3 = 7 J

6. (A)

Sol. $W = \vec{F}.(\vec{r_2} - \vec{r_1}) = (4\hat{i} + \hat{j} + 3\hat{k})(11\hat{i} + 11\hat{j} + 15\hat{k})$

$W = 44 + 11 + 45 = 100\ Joule$

7. (A)

Sol. Both part will have numerically equal momentum and lighter part will have more velocity.

8. (D)

Sol. $W = \vec{F}.\vec{s} = (6\hat{i} + 2\hat{j} - 3\hat{k}).(2\hat{i} - 3\hat{j} + x\hat{k}) = 0$

$12 - 6 - 3x = 0 \Rightarrow x = 2$

9. (A)

Sol. ΔP.E. $= \frac{1}{2}k(x_2^2 - x_1^2) = \frac{1}{2} \times 10[(0.25)^2 - (0.20)^2]$

$= 5 \times 0.45 \times 0.05 = 0.1\ J$

10. (C)

Sol. $U = \frac{F^2}{2k} \Rightarrow \frac{U_1}{U_2} = \frac{k_2}{k_1}$ (if force are same)

$\therefore \frac{U_1}{U_2} = \frac{3000}{1500} = \frac{2}{1}$

11. (D)

Sol. $U \propto x^2 \Rightarrow \frac{U_2}{U_1} = \left(\frac{x_2}{x_1}\right)^2 = \left(\frac{0.1}{0.02}\right)^2 = 25$ $\therefore$

$U_2 = 25U$

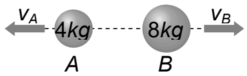
12. (C)

Sol. $P = \sqrt{2mE}$ $\therefore$ $P \propto \sqrt{m}$ (if $E = \text{const.}$) $\therefore$

$\frac{P_1}{P_2} = \sqrt{\frac{m_1}{m_2}}$

13. (D)

Sol. As the initial momentum of bomb was zero, therefore after explosion two parts should possess numerically equal momentum



i.e. $m_A v_A = m_B v_B \Rightarrow 4 \times v_A = 8 \times 6 \Rightarrow$

$v_A = 12\ m/s$

$\therefore$ Kinetic energy of other mass *A*, = $\frac{1}{2}m_A v_A^2$

= $\frac{1}{2} \times 4 \times (12)^2$ = 288 *J*.

14. (C)

Sol. $P = \sqrt{2mE}$. If *E* are same then $P \propto \sqrt{m}$

$\Rightarrow \frac{P_1}{P_2} = \sqrt{\frac{m_1}{m_2}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

15. (D)

Sol. $E = \frac{P^2}{2m} \Rightarrow E_2 = E_1\left(\frac{P_2}{P_1}\right)^2 = E_1\left(\frac{2P}{P}\right)^2$

$\Rightarrow E_2 = 4E = E + 3E = E + 300\%$ of *E*

16. (D)

Sol. $F \propto \frac{1}{r^2}$. If *r* becomes double then *F* reduces to $\frac{F}{4}$

17. (A)

18. (C)

Sol. $g = \frac{GM}{r^2}$. Since *M* and *r* are constant, so

$g = 9.8\ m/s^2$

19. (C)

Sol. $g = \frac{GM}{R^2}$ and $M = \frac{4}{3}\pi R^3 \times \rho$

$\therefore g = \frac{4}{3}\frac{\pi R^3 \times G\rho}{R^2} \Rightarrow \rho = \frac{3g.}{4\pi RG}$

20. (C)
Sol. Value of g decreases when we go from poles to equator.

21. (A)
Sol. $\frac{g'}{g} = \left(\frac{R}{R+h}\right)^2 = \left(\frac{6400}{6400+64}\right)^2$
$\Rightarrow g' = 960.40\ cm/s^2$

22. (B)
Sol. $g' = g\left(\frac{R}{R+h}\right)^2 \quad \Rightarrow \quad \frac{g}{4} = g\left(\frac{R}{R+h}\right)^2 \quad \Rightarrow$
$\frac{1}{2} = \frac{R}{R+h} \qquad \Rightarrow R+h = 2R \therefore\ h = R$

23. (B)
Sol. $g = \frac{GM}{R^2} \Rightarrow R = \sqrt{\frac{GM}{g}}$

24. (C)
Sol. $g_p = g_e\left(\frac{M_p}{M_e}\right)\left(\frac{R_e}{R_p}\right)^2 = 9.8\left(\frac{1}{80}\right)(2)^2$
$= 9.8/20 = 0.49\ m/s^2$

25. (D)
Sol. $g = \frac{4}{3}\pi\rho GR \Rightarrow \frac{R_p}{R_e} = \left(\frac{g_p}{g_e}\right)\left(\frac{\rho_e}{\rho_p}\right) = (1)\times\left(\frac{1}{2}\right)$
$\Rightarrow R_p = \frac{R_e}{2} = \frac{R}{2}$

26. (A)
Sol. $I = \frac{-dV}{dx}$
If V = 0 then gravitational field is necessarily zero.

27. (D)
Sol. $\Delta U = U_2 - U_1 = \frac{mgh}{1+\frac{h}{R_e}} = \frac{mgR_e}{1+\frac{R_e}{R_e}} = \frac{mgR_e}{2}$
$\Rightarrow U_2 - (-mgR_e) = \frac{mgR_e}{2} \quad \Rightarrow \ U_2 = -\frac{1}{2}mgR_e$

28. (A)
Sol. $v_e = \sqrt{\frac{2GM}{R}} = R\sqrt{\frac{8}{3}\pi G\rho} \quad \therefore\ v_e \propto R$ if ρ = constant
Since the planet having double radius in comparison to earth therefore the escape velocity becomes twice *i.e.* 22 *km/s.*

29. (B)
Sol. $v_e = \sqrt{2gR}$ and $v_0 = \sqrt{gR} \therefore\ \sqrt{2}\,v_0 = v_e$

30. (D)

31. (C)
Sol. Linear speed V = rω
V depends on radius

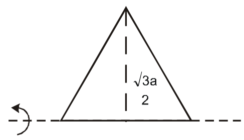
32. (B)
Sol. $\theta = \omega t + \frac{1}{2}\alpha t^2 = 10$ rad

33. (C)
Sol. V = ωR
V = 10 × 0.2 = 2m /sec.

34. (C)
Sol. $I_x + I_y = I_z$
z axes is perpendicular to plane of body.

35. (B)
Sol. $I = I_{CM} + Md^2$
$I = \frac{ML^2}{12} + M\left(\frac{L}{2}\right)^2$
$I = \frac{ML^2}{3}$

36. (C)
Sol. $I = m\left(\frac{\sqrt{3}a}{2}\right)^2$
$I = \frac{3ma^2}{4}$



37. (B)
Sol. $\frac{I_1}{I_2} = \frac{m_1R_1^2}{m_1R_2^2} = \frac{m_1}{m_2}\times\frac{4}{1} = \frac{2}{1}$
$\frac{m_1}{m_2} = \frac{1}{2}$

38. (A)
Sol. $I = \frac{5}{4}MR^2$
$I' = \frac{3}{2}MR^2 = \frac{6}{5}I$

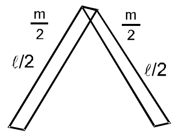
39. (B)
Sol. $\frac{I_{ring}}{I_{Disc}} = \frac{MR^2}{\frac{MR^2}{2}} = 2$

40. (A)

Sol. The moment of inertia in rotational motion is equivalent to mass as in linear motion.

41. (C)

Sol.



$I_0 = I_1 + I_2$

$$I_0 = \frac{(m/2)\left(\frac{\ell}{2}\right)^2}{3} + \frac{(m/2)\left(\frac{\ell}{2}\right)^2}{3} = \frac{(m/\ell^2)}{12}$$

42. (A)

Sol. Moment of inertia depends on distribution of mass about axis of rotation. Density of iron is more than that of aluminium, therefore for moment of inertia to be maximum, the iron should be far away from the axis. Thus, aluminium should beat interior and iron surrounds it.

43. (C)

Sol. If a body has mass M and radius of gyration is K, then $I = MK^2$

Moment of inertia of a disc and circular ring about a tangential axis in their planes are respectively.

$I_d = \frac{5}{4}M_dR^2 \quad \Rightarrow I_r = \frac{3}{2}M_rR^2$

but $\quad I = MK^2 \quad \Rightarrow K = \sqrt{\frac{I}{M}}$

$\therefore \quad \frac{K_d}{K_r} = \sqrt{\frac{I_d}{I_r} \times \frac{M_r}{M_d}}$ or

$$\frac{I_d}{I_r} = \sqrt{\frac{(5/4)M_dR^2}{(3/2)M_rR^2} \times \frac{M_r}{M_d}} = \sqrt{\frac{5}{6}}$$

$\therefore \quad I_d : I_r = \sqrt{5} : \sqrt{6}$

44. (A)

Sol. $\ell = 3$ kg m^2, $\tau = 6$ Nm, t = 20 sec

From $\tau = I\alpha$

Angular accleration $\alpha = \frac{\tau}{I} = \frac{6}{3} = 2$ rad/sec^2

$\therefore$ Angular displacement

$= \omega_0 t + \frac{1}{2}\alpha t^2$

$= 0 \times 20 + \frac{1}{2}(2)(20)^2$

= 400 radian

45. (C)

Sol. Direction of Angular momentum is along the direction of angular velocity, which is an axial vector.

46. (D)

Sol. If torque external = 0, then angular momentum = constant **=** $I\omega$

47. (D)

Sol. When frictional force is opposite to velocity, kinetic energy will decrease.

48. (B)

49. (A)

Sol. Because of the rotation of the earth, the value of acceleration due to gravity changes. Due to this rotation, the value of g becomes minimum at the equator and maximum at the poles.

50. (B)

Sol. The correct option is **B** Velocity of COM

CHEMISTRY

51. (A)

Sol. $W = -P\Delta V$

$= -1.5\,(1-0.5)$

$= -0.75$ atm-litre $= -0.75 \times 101$ Joule

q = 200 J

$\because q = \Delta E - W$

$200 = \Delta E - (-0.75 \times 101)$

$\Delta E = 124.25$ Joule

52. (B)

Sol. $\Delta H = \Delta E + \Delta n\, RT$

Given

$\Delta H = -651 \times 10^3$ cal. , R = 2 cal,

T = 290 K and $\Delta n = 6 + 6 - 6 = 6$

$\therefore \Delta E = -651 \times 10^3 - 6 \times 2 \times 290$

$= -654480$ cal

$= -654.5$ kcal

53. (D)

Sol. $\because$ 58 g isobutane provides energy = 2658 kJ

$\therefore 11.2 \times 10^3$ g isobutane provides energy

$= \frac{2658 \times 11.2 \times 10^3}{58}$ kJ = 513268.9 kJ

The daily requirement of energy = 15000 kJ

$\therefore$ cylinder will last $= \frac{513268.9}{15000}$ = 34 days

54. (B)

Sol. $\Delta S_f = \frac{\Delta H_f}{T} = \frac{6025}{273} = 22.1\ JK^{-1}\ mol^{-1}$

55. (C)

Sol. $\Delta G^o = 2 \times \Delta G^o\ NH_3 - \Delta G^o\ N_2 - (\Delta G^o\ H_2 \times 3)$

$= 2 \times (-16.66) - 0 - 0$

$= -33.32$ kJ

56. (B)

Sol. $2A_2(g) + 5B_2(g) \rightarrow 2A_2B_5\ (g);\ \Delta H = -50160$ J

$\Delta n = 2 - (5 + 2) = -5$ mol.

$\Delta H = \Delta E + (\Delta n)\ RT$

$-50160 = \Delta E + (\Delta n)\ RT$

$\Delta E = -50160 - (-5)\ (8.314)\ (300)$

$= -50160 + 12471 = -37689$ J

57. (D)

Sol. $\Delta H^o = \Sigma\Delta H^{\circ}_{f\ (products)} - \Sigma\Delta\ H^{\circ}_{f\ (Reactants)}$

$= [\Delta H^0_{f(H_2O)} + \Delta H^0_{f(CO)}] - [\Delta H^0_{f(CO_2)} + \Delta H^0_{f(H_2)}]$

$\Delta H^o = [-241.8 - 110.5] - [-393.5 + 0]$

$= -352.3 + 393.5 = +41.2$ kJ

58. (C)

Sol. We have,

$W = -2.303\ nRT \log \frac{V_2}{V_1}$

$= -2.303 \times 2 \times 2 \times 298 \times \log \frac{50}{15}$

$= -1426.87$ cal.

59. (A)

Sol. We have,

$\Delta H = \Delta E + \Delta n_g RT$

Here, $\Delta n_g = 6 - 7.5 = -1.5$

Thus, $\Delta E = \Delta H - n_g RT$

$= -780980 - (-1.5) \times 2 \times 298$

$= -780086$ calories.

60. (B)

Sol. Heat released to cool 500 g water from 20°C to 0°C, $q = ms\ \Delta T$

$= 500 \times 4.18 \times 20 = 41800\ J = 41.8$ kJ

Number of moles of water (ice) that will melt to absorb 41.8 kJ

$= \frac{41.8}{6.02} \approx 7$

$\therefore$ Number of cubes of ice that will melt = 7

61. (D)

Sol. C – E bond has highest bond energy ; it means that the covalent bond C – E will be strongest. Smaller is the size of atom, stronger is the covalent bond.

62. (C)

Sol. Work done in the cyclic process

= Area bounded (ABCA)

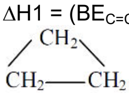
$= \frac{1}{2} \times AC \times AB$

$= \frac{1}{2} \times 2V_1 \times 3P_1 = 3P_1V_1$

63. (B)

Sol. $CH_3 - CH = CH_2 + H_2 \longrightarrow CH_3 - CH_2 - CH_3$;

$\Delta H1 = (BE_{C=C} + BE_{H-H}) - (2BE_{C-H} + BE_{C-C})$



$+ H_2 \rightarrow CH_3 - CH_2 - CH_3$

$\Delta H_2 = (BE_{C-C} + BE_{H-H}) - (2 \times BE_{C-H})$

$\Delta H_2 - \Delta H_1 = 2BE_{C-C} - BE_{C=C}$

64. (D)

Sol. $C_V = \frac{\Delta U}{n\Delta T}, n = \frac{4.48}{22.4} = 0.2$

$= \frac{12}{0.2 \times 15} = 4$ cal

$C_P = C_v + R = 4 + 2 = 6$ cal

65. (D)

Sol. $2A_2(g) + 5B_2(g) \rightarrow 2A_2B_5(g)$

$T = 27°C = 300$ K

$\Delta H = \Delta E + \Delta nRT$

$\Delta n = 2-(5+2) = -5$

$\Delta H - \Delta E = \Delta nRT = X$

$\frac{X}{R} = \Delta nT = -5 \times 300 = -1500 = -1.5 \times 10^3$

66. (B)

Sol. 1 litre atmosphere

$1\ atm = 1.01 \times 10^5\ N/m^2$

$1\ litre = 10^{-3}\ m^3$

$1\ L\text{-}atm = 1.01 \times 10^5 \times 10^{-3} = 101$ Joule

67. (C)

Sol. $NH_4NO_3(s) \rightarrow N_2O(g) + 2H_2O$

$\Delta H = -37$ kJ/mol

Given 2.5 g NH_4NO_3

mole of $NH_4NO_3 = \frac{2.5}{80} = \frac{25}{800} = \frac{1}{32}$ mole

1 mole NH_4NO_3 gives 37 kJ of heat

Thus $\frac{1}{32}$ moles of NH_4NO_3 gives $\frac{37 \times 1}{32}$

= 1.16 kJ

68. (B)

Sol. Combustion of substance, $C + O_2 \rightarrow CO_2$
Heat is released during the combustion
so it will be always exothermic, $\Delta H =(-)$

69. (D)
Sol. Hess's Law depends on initial and final condition of the reacting substances.

70. (B)
Sol. The change in Gibbs free energy associated with a chemical reaction is a useful indicator of whether the reaction will proceed spontaneously. In reversible reaction change in Gibbs free energy at equilibrium is zero.

71. (D)
Sol. $\Delta G = \Delta H - T\Delta S$
$\Delta S = \frac{1}{T}\,[\Delta H - \Delta G]$
$T\Delta S = \Delta H - \Delta G$

72. (B)
Sol. Entropy of universe is always increasing.
$\Delta S_{system} + \Delta S_{surrounding} > 0$
$\Delta S_{universe} > 0$

73. (D)
Sol. $CO2(g) + C(s) \rightarrow 2CO(g)$
$\Delta H = +170$ kJ and $\Delta S = 170\ JK^{-1}$
For spontaneous reaction $\Delta G = (-)$
$\Delta G = \Delta H - T\Delta S$ if $\Delta G < 0$
$\Delta H = 170 \times 10^3$ J = 170000 Joule
$170000 - T\times170 < 0$
$T > 170000/170$
$T > 1000$
$T = 1200$ K

74. (A)
Sol. C (graphite) is the native of carbon element.
So the heat of formation at standard condition is zero.

75. (D)
Sol. For spontaneous $\Delta G = -ve$,
$\Delta G = \Delta H - T\Delta S$
if we put $\Delta H = -ve$ and $\Delta S = +ve$
then we always get $\Delta G = -ve$

76. (C)
Sol. Heat capacity (Thermal) by definition

77. (D)
Sol. Second Law of thermodynamics state the direction of heat flow from higher temperature to lower temperature.

78. (C)
Sol. Heat is release during the process of combustion since it is a exothermic process.
Hence, ΔH = '–' negative
$\Delta H = -2658$ kJ/mol

79. (A)
Sol. $A(g) + B(g) \rightarrow C(g) + D(g)$
$\Delta H = \Delta U + \Delta nRT$
$\Delta n = 2-2 = 0$ for given reaction
then $\Delta H = \Delta U = \Delta E$

80. (B)
Sol. 1 cal = 4.2 J
1 J = 10^7 erg
So cal > J > erg

81. (C)
Sol. State function does not depend upon path. Work depend upon path so it is not a state function.

82. (B)
Sol. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
moles of $CH_4 = \frac{4}{16} = \frac{1}{4}$
$\therefore \frac{1}{4}$ moles of CH_4 = 2.5 kcal
$\therefore$ For 1 mole of $CH_4 = 4\times2.5 = 10$ kcal

83. (D)
Sol. Enthalpy of formation of compound can be positive or negative.

84. (B)
Sol. Combustion of substance, $C + O_2 \rightarrow CO_2$
Heat is released during the combustion so it will be always exothermic, $\Delta H =(-)$

85. (A)
Sol. $\left.\begin{array}{l}\text{500 mL of 0.2 M KOH}\\ \text{500 mL of 0.2 M HCl}\end{array}\right\rangle \text{Mixing}$
$\text{No. of mole of KOH} = \frac{0.2\times500}{1000} = 0.1\ \text{mole}$
$\text{No. of mole of HCl} = \frac{0.2\times500}{1000} = 0.1\ \text{mole}$
Then, quantity changes to 250 mL of solution and the experiment is repeated. Temperature does not depend upon volume of liquid solution therefore both 500 mL solution and 200 mL gives same temperature while mixing.
$T_1 = T_2$

86. (D)

Sol. $2N_2(g) + 6H_2(g) \longrightarrow 4NH_3(g)$

$\Delta H(\text{Formation}) = \underset{(\text{Product})}{\Delta H_P} - \underset{(\text{Reaction})}{\Delta H_R}$

$\Delta H_f = 4\times -46 - 0 = -184$ kJ

87. (D)

Sol. Hydrogen is in the gaseous state. The substance in the gaseous state has the highest entropy compared to solid and liquid state.

88. (B)

Sol. $\Delta G = -5.2$ kJ $\Delta H = 145.6$ kJ

$\Delta S = 216\ JK^{-1}$ $\Delta G = \Delta H - T\Delta S$

$-5.2\times10^3 = 145.6\times10^3 - T\times216$

$-5200 = 145600 - 216T$

$-216T = -150800$

$T = \frac{150800}{216} = 698K$

in °C = 698 – 273 = 425 °C

89. (A)

Sol. $\Delta H_V = 186.5$ J/mol

$T\Delta S_V = \Delta H_V$ $\quad T_V = 100°C = 373$ K

$\Delta S_V = \frac{\Delta H_V}{T_V} = \frac{186.5}{373} = 0.5\ JK^{-1}mol^{-1}$

90. (A)

Sol. V_1 = litre $\quad V_2 = 10$ litre

Workdone by system = $P\Delta V$

= 0.5 atm (10– 1) litre

W = 0.5×9×101 = 455 J

W = –455 J

(work done by system, sign convention)

$q = \Delta U - W$

Heat absorb so q = +ve

$250 = \Delta U - (-455)$

$\Delta U = 250 - 455 = -205$ J

91. (B)

Sol. Entropy corresponds to the freeness of the system.

$\Delta S \neq 0$

92. (C)

Sol. According to Third law of thermodynamics, at 0 K temperature entropy of crystalline solid becomes zero. So we can use this for calculating absolute entropy.

93. (B)

Sol. $RSH \xrightarrow{\text{Combustion}}$

R is alkyl group

$RSH + O_2 \longrightarrow CO_2(g)\uparrow + H_2O(\ell) + SO_2(g)\uparrow$

94. (A)

Sol. $\Delta G = \Delta H - T\Delta S$

For spontaneous reaction ΔG should be negative $\boxed{\Delta G < 0}$

For Exothermic Reaction

$\Delta H = (-)$

$\Delta S = +ve$

$\Delta G = (-) - + = -ve$; So spontaneity possible

at all T because

$T\Delta S = +ve$ & $\Delta n = (-)$

$\Delta G = -ve$

95. (A)

Sol. Heat of formation of H_2O

$H_2(g) + \frac{1}{2}O_2(g) \longrightarrow H_2O(\ell)$

$\Delta H = -68.3$ kcal

$\Delta H_{H_2} = \Delta H_{O_2} = 0$

96. (D)

Sol. Occurrence of reaction is not possible if ΔG

= +ve

$\Delta G = \Delta H - T\Delta S$ — (1)

if ΔH = + ve and ΔS = – ve

putting in equation (1) we get

$\Delta G = + - (-)$

$\Delta G = + + = +ve$

So reaction will be non-spontaneous. Thus, occurrence of reactive is impossible.

97. (A)

Sol. Since gas molecules are uniformly distributed in the container , therefore in one dimension $u_{avg} = 0$

98. (B)

Sol. rate of effusion $\propto \left(\begin{smallmatrix}\text{surface area}\\ \text{of pore}\end{smallmatrix}\right) \times u_{avg} \times P_{gas}$

Since $u_{avg} = \sqrt{\frac{8RT}{\pi M}}$ hence rate of effusion increases with the increase in temperature.

99. (D)

Sol. Kinetic energy of photoelectrons is proportional to frequency of the incident radiation and not intensity.

100. (D)

Sol. For exothermic reaction

$(E_a)_{minimum} \geq 0$.