EDT-07 (NEET) SOLUTIONS

1. (b)

Sol. Pressure at bottom of the lake = $P_0 + h\rho g$ and pressure ay half the depth of a lake $= P_0 + \frac{h}{2}\rho g$

According to given condition $P_0 + \frac{1}{2}h\rho g = \frac{2}{3}(P_0 + h\rho g)$

$\Rightarrow \frac{1}{3}P_0 = \frac{1}{6}h\rho g \Rightarrow h = \frac{2P_0}{\rho g} = \frac{2\times 10^5}{10^3 \times 10} = 20m$.

2. (a)

Sol. Velocity head $h = \frac{v^2}{2g} = \frac{(5)^2}{2\times 10} = 1.25\ m$

3. (b)

Sol. $F = 6\pi\eta rv$

4. (b)

Sol. In the first 100 m body starts from rest and its velocity goes on increasing and after 100 m it acquire maximum velocity (terminal velocity). Further, air friction i.e. viscous force which is proportional to velocity is low in the beginning and maximum at $v = v_T$. Hence work done against air friction in the first 100 m is less than the work done in next 100 m.

5. (c)

Sol. If two drops of same radius r coalesce then radius of new drop is given by R

$\frac{4}{3}\pi R^3 = \frac{4}{3}\pi r^3 + \frac{4}{3}\pi r^3 \Rightarrow R^3 = 2r^3 \Rightarrow R = 2^{1/3}r$

If drop of radius r is falling in viscous medium then it acquire a critical velocity v and $v \propto r^2$

$\frac{v_2}{v_1} = \left(\frac{R}{r}\right)^2 = \left(\frac{2^{1/3}r}{r}\right)^2$

$\Rightarrow v_2 = 2^{2/3} \times v_1 = 2^{2/3} \times (5) = 5 \times (4)^{1/3}\ m/s$

6. (c)

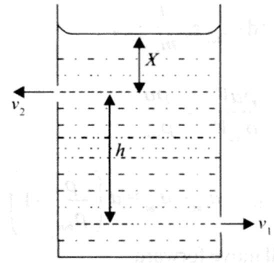
Sol. The additional push gives an unbalanced force and according to Newton's first law it will continue to move down and sink.

7. (c)

Sol. The force on two liquid states must provide a net upward force due to surface tension to balance the weight of H_2O.

8. (b)

Sol.



$v_1 = \sqrt{2g(h+x)}$, $v_2 = \sqrt{2gx}$

Let ρ = density of the liquid.

Let α = area of cross – section of each hole.

Volume of liquid discharged per second at a hole

= αv ($v = v_1$ or v_2)

Mass of liquid discharged per second = αvρ.

Momentum of liquid discharged per second = $\alpha v^2 \rho$.

⇒ The force exerted at the upper hole (to the right) = $\alpha\rho v_2^2$

and the force exerted at the lower hole (to the left) = $\alpha\rho v_1^2$.

Net fore on the tank = $\alpha\rho[v_1^2 - v_2^2] = \alpha\rho[2g(h + x) - 2gx]$

= 2αρgh.

9. (b)

Sol. $v_T = \frac{2}{9}\frac{r^2 g}{\eta}(d_b - d_e) \Rightarrow \eta = \frac{2r^2 g}{9v}(d_b - d_e)$

= $\frac{2\times0.2\times0.2\times9\times980}{9\times8}$ = 9.8 poise

10. (d)

Sol. Q = Av $v = \frac{Q}{A} = \frac{100\times10^{-6}}{0.25}$

$v = 400 \times 10^{-3}$ mm/s = 0.4 mm/s

11. (a)

Sol. $\cos\theta = \frac{h}{\ell} \Rightarrow h = \ell \cos\theta$

$\ell = \frac{h}{\cos\theta}$

$\Rightarrow \ell = \frac{2}{\cos 60°} \Rightarrow 4\text{cm}$

12. (b)

Sol. $v \propto r^2$; $\frac{r_1}{r_2} = \sqrt{\frac{v_1}{v_2}}$

13. (b)

Sol. mass = $\frac{4}{3}\pi r^3 \times \rho$. so when mass become 8M so radius will become 2r & terminal velocity $V_t \propto r^2$

so it becomes 4 times of its previous value.

14. (d)

Sol. $F = \eta A \frac{dv}{dx} \Rightarrow \frac{F}{A} = \eta \frac{dv}{dx}$ = Dimension of pressure

15. (b)

Sol. If two liquid of equal masses and different densities are mixed together then density of mixture

$\rho = \frac{2\rho_1\rho_2}{\rho_1+\rho_2} = \frac{2\times1\times2}{1+2} = \frac{4}{3}$

16. (b)

Sol. In a streamline flow the two stream lines cannot cross each other so option (b) cannot be a streamline flow.

17. (d)

Sol. When a solid sphere falls in vacuum no viscous force is acting on the sphere and the sphere falls under gravity due to which sphere never attains terminal velocity.

18. (b)

Sol. Viscosity of a liquid decreases with increase in temperature Whereas viscosity of gases increase with increase in temperature.

19. (b)

Sol. Here diameter of the tap,

$D = 1.25\,cm = 1.25\times10^{-2}\,m$

Density of water $\rho = 10^3\,kg\,m^{-3}$

Coefficient of viscosity $\eta = 10^{-3}\,Pa\,s$

Volume of water flowing out per second is

$Q = 3\,L\text{ per min} = \frac{3\times10^{-3}\,m^3}{60s} = 5\times10^{-5}\,m^3s^{-1}$

Reynolds number is given by

$R_e = \frac{4\rho Q}{\pi D\eta} = \frac{4\times10^3\,kg\,m^{-3}\times5\times10^{-5}\,m^3s^{-1}}{3.14\times1.25\times10^{-2}\,m\times10^{-3}\,Pa\,s}$

$= 5095 > 2000$

Thus, the flow will be turbulent.

20. (d)

Sol. Apparent weight $= V(\rho-\sigma)g = \frac{m}{\rho}(\rho-\sigma)g$

where $m =$ mass of the body, $\rho =$ density of the body and

$\sigma =$ density of water

If two bodies are in equilibrium then their apparent weight must be equal.

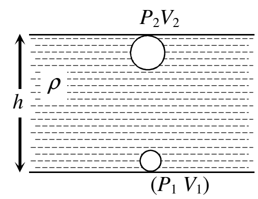
$\therefore \ \frac{m_1}{\rho_1}(\rho_1 - \sigma)g = \frac{m_2}{\rho_2}(\rho_2 - \sigma)g$

$\Rightarrow \ \frac{36}{9}(9-1) = \frac{48}{\rho_2}(\rho_2 - 1)g$.

By solving we get $\rho_2 = 3$.

21. (b)

Sol. According to Boyle's law, pressure and volume are inversely proportional to each other i.e. $P \propto \frac{1}{V}$



$\Rightarrow \ P_1V_1 = P_2V_2$

$\Rightarrow \ (P_0 + h\rho_w g)V_1 = P_0 V_2$

$\Rightarrow V_2 = \left(1 + \frac{h\rho_w g}{P_0}\right)V_1$

$\Rightarrow \ V_2 = \left(1 + \frac{47.6 \times 10^2 \times 1 \times 1000}{70 \times 13.6 \times 1000}\right)V_1$

[As $P_2 = P_0 = 70\ cm$ of Hg $= 70 \times 13.6 \times 1000$]

$\Rightarrow V_2 = (1+5)50\ cm^3 = 300\ cm^3$.

22. (c)

Sol. Pressure at the bottom

$P = (h_1d_1 + h_2d_2)\frac{g}{cm^2}$

$= [250 \times 1 + 250 \times 0.85] = 250\ [1.85]\frac{g}{cm^2}$

$= 462.5\frac{g}{cm^2}$

23. (c)

Sol. Weight of the bowl = mg = $V\rho g$

$= \frac{4}{3}\pi\left[\left(\frac{D}{2}\right)^3 - \left(\frac{d}{2}\right)^3\right]\rho g$

where D is the outer diameter , d is the inner diameter and ρ is the density of bowl

Weight of the liquid displaced by the bowl $= V\sigma g$

$= \frac{4}{3}\pi\left(\frac{D}{2}\right)^3 \sigma\, g$

where σ is the density of the liquid.

For the flotation $\frac{4}{3}\pi\left(\frac{D}{2}\right)^3\sigma g = \frac{4}{3}\pi\left[\left(\frac{D}{2}\right)^3 - \left(\frac{d}{2}\right)^3\right]\rho g$

$\Rightarrow \left(\frac{1}{2}\right)^3 \times 1.2\times 10^3 = \left[\left(\frac{1}{2}\right)^3 - \left(\frac{d}{2}\right)^3\right]2\times 10^4$

By solving we get d = 0.98 m.

24. (c)

Sol. Specific gravity of alloy $= \frac{\text{Density of alloy}}{\text{Density of water}}$

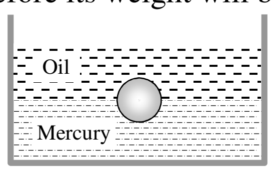
$= \frac{\text{Mass of alloy}}{\text{Volume of alloy} \times \text{density of water}}$

$= \frac{m_1 + m_2}{\left(\frac{m_1}{\rho_1} + \frac{m_2}{p_2}\right)\times \rho_w} = \frac{m_1 + m_2}{\frac{m_1}{\rho_1/\rho_w} + \frac{m_2}{\rho_2/\rho_w}} = \frac{m_1 + m_2}{\frac{m_1}{s_1} + \frac{m_2}{s_2}}$

$\left[\text{As specific gravity of substance} = \frac{\text{density of substance}}{\text{density of water}}\right]$

25. (c)

Sol. As the sphere floats in the liquid. Therefore its weight will be equal to the upthrust force on it



Weight of sphere $= \frac{4}{3}\pi R^3 \rho g$ .... (i)

Upthrust due to oil and mercury

$= \frac{2}{3}\pi R^3 \times \sigma_{oil} g + \frac{2}{3}\pi R^3 \sigma_{Hg} g$ ......(ii)

Equating (i) and (ii)

$\frac{4}{3}\pi R^3 \rho g = \frac{2}{3}\pi R^3 0.8 g + \frac{2}{3}\pi R^3 \times 13.6 g$

$\Rightarrow 2\rho = 0.8 + 13.6 = 14.4 \Rightarrow \rho = 7.2$

26. (d)

Sol. Reading of the spring balance = Apparent weight of the block = Actual weight – upthrust

$= 12 - V_{in}\sigma g$

$= 12 - 500\times 10^{-6} \times 10^3 \times 10 = 12 - 5 = 7N.$

27. (c)

Sol. For the floatation of ice-berg, Weight of ice

= upthrust due to displaced water

$V\rho g = V_{in}\sigma g$

$\Rightarrow V_{in} = \left(\frac{\rho}{\sigma}\right)V = \left(\frac{0.92}{1.03}\right)V = 0.89\,V$

$\therefore \frac{V_{in}}{V} = 0.89$ or 89%.

28. (c)

Sol. Upthrust on ball = weight of displaced water

$= V\sigma g = \left(\frac{m}{\rho}\right)\sigma g = \frac{40}{0.8} \times 1 \times g = 50g$ Dyne or 50 gm

As the ball is sunk into the water with a pin by applying downward force equal to upthrust on it.
So reading of weighing pan = weight of water + downward force against upthrust
= 600 + 50 = 650 gm.

29. (d)

Sol. $a_1 v_1 = a_2 v_2$

$\Rightarrow 4.20 \times 5.18 = 7.60 \times v_2 \Rightarrow v_2 = 2.86\ m/s$

30. (b)

Sol.

Bernoulli's theorem for unit mass of liquid $\frac{P}{\rho} + \frac{1}{2}v^2 =$ Constant

As the liquid starts flowing, it pressure energy decreases $\frac{1}{2}v^2 = \frac{P_1 - P_2}{\rho}$

$\Rightarrow \frac{1}{2}v^2 = \frac{3.5 \times 10^5 - 3 \times 10^5}{10^3} \Rightarrow v^2 = \frac{2 \times 0.5 \times 10^5}{10^3}$

$\Rightarrow v^2 = 100 \Rightarrow v = 10\ m/s$

31. (c)

Sol. Time taken for the level to fall from H to H'

$t = \frac{A}{A_0}\sqrt{\frac{2}{g}}\left[\sqrt{H} - \sqrt{H'}\right]$

According to problem- the time taken for the level to fall from h to $\frac{h}{2}$ $t_1 = \frac{A}{A_0}\sqrt{\frac{2}{g}}\left[\sqrt{h} - \sqrt{\frac{h}{2}}\right]$

and similarly time taken for the level to fall from $\frac{h}{2}$ to zero

$t_2 = \frac{A}{A_0}\sqrt{\frac{2}{g}}\left[\sqrt{\frac{h}{2}} - 0\right]$

$\therefore \frac{t_1}{t_2} = \frac{1-\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}-0} = \sqrt{2}-1.$

32.(b)

Sol. $v = \sqrt{2gh} = \sqrt{2\times 10\times 20} = 20\, m/s$

33. (c)

Sol. Time required to emptied the tank $t = \frac{A}{A_0}\sqrt{\frac{2H}{g}}$

$\Rightarrow \frac{t_2}{t_1} = \sqrt{\frac{H_2}{H_1}} = \sqrt{\frac{4h}{h}} = 2 \quad \therefore\ t_2 = 2t$

34. (a)

Sol. The height of water in the tank becomes maximum when the volume of water flowing into the tank per second becomes
equal to the volume flowing out per second.

Volume of water flowing out per second = Av $= A\sqrt{2gh}$

and volume of water flowing in per second $= 70\, cm^3/\sec$.

$\therefore\ A\sqrt{2gh} = 70 \Rightarrow 1\times\sqrt{2gh} = 70 \Rightarrow 1\times\sqrt{2\times 980\times h} = 70$

$\therefore\ h = \frac{4900}{1960} = 2.5\, cm.$

35. (d)

Sol. $A = (0.1)^2 = 0.01 m^2$,

$\eta = 0.01\ \ Poise = 0.001\ \ decapoise$

(M.K.S. unit), dv = 0.1 m/s and F = 0.002 N

$F = \eta A\frac{dv}{dx}$

$\therefore\ dx = \frac{\eta A dv}{F} = \frac{0.001\times 0.01\times 0.1}{0.002} = 0.0005\, m$.

36. (c)

Sol. Velocity of ball when it strikes the water surface

$v = \sqrt{2gh}$ ....(i)

Terminal velocity of ball inside the water

$v = \frac{2}{9}r^2 g\frac{(\rho-1)}{\eta}$ ....(ii)

Equating (i) and (ii) we get $\sqrt{2gh} = \frac{2}{9}\frac{r^2 g}{\eta}(\rho-1)$

$\Rightarrow\ h = \frac{2}{81}r^4\left(\frac{\rho-1}{\eta}\right)^2 g$

37. (b)

Sol. Rate of flow of liquid $V = \frac{P}{R}$

where liquid resistance $R = \frac{8\eta l}{\pi r^4}$

For another tube liquid resistance

$$R' = \frac{8\eta l}{\pi\left(\frac{r}{2}\right)^4} = \frac{8\eta l}{\pi r^4}.16 = 16R$$

For the series combination

$$V_{New} = \frac{P}{R+R'} = \frac{P}{R+16R} = \frac{P}{17R}$$

$$= \frac{V}{17}.$$

38. (d)

Sol. From $V = \frac{P\pi r^4}{8\eta l}$

$$\Rightarrow P = \frac{V8\eta l}{\pi r^4}$$

$$\Rightarrow \frac{P_2}{P_1} = \frac{V_2}{V_1} \times \frac{l_2}{l_1} \times \left(\frac{r_1}{r_2}\right)^4 = 2 \times 2 \times \left(\frac{1}{2}\right)^4 = \frac{1}{4}$$

$$\Rightarrow P_2 = \frac{P_1}{4} = \frac{P}{4}.$$

39. (c)

Sol. For parallel combination $\frac{1}{R_{eff}} = \frac{1}{R_1} + \frac{1}{R_2}$

$$\Rightarrow \frac{\pi r^4}{8\eta l} = \frac{\pi r^4}{8\eta l_1} + \frac{\pi r^4}{8\eta l_2} \Rightarrow \frac{1}{l} = \frac{1}{l_1} + \frac{1}{l_2} \quad \therefore l = \frac{l_1 l_2}{l_1 + l_2}$$

40. (b)

Sol. $V = \frac{\pi P r^4}{8\eta l} = \frac{8cm^3}{sec}$

For composite tube $V_1 = \frac{P\pi r^4}{8\eta\left(l + \frac{l}{2}\right)} = \frac{2}{3}\frac{\pi P r^4}{8\eta l}$

$$= \frac{2}{3} \times 8 = \frac{16}{3}\frac{cm^3}{sec} \qquad \left[\because l_1 = l = 2l_2 \text{ or } l_2 = \frac{l}{2}\right]$$

41. (b)

Sol. $V = \frac{P\pi r^4}{8\eta l}$

$$\Rightarrow \frac{V_2}{V_1} = \left(\frac{r_2}{r_1}\right)^4$$

$\Rightarrow V_2 = V_1\left(\frac{110}{100}\right)^4 = V_1(1.1)^4 = 1.4641\,V$

$\frac{\Delta V}{V} = \frac{V_2 - V_1}{V} = \frac{1.4641\,V - V}{V} = 0.46$ or 46% .

42. (b)

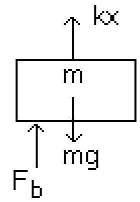
Sol. $13.6 \times y \times Ag = 1 \times 15 \times A \times g$

$y = \frac{15}{13.6}$ and $h = 15 - \frac{15}{13.6} = 13.9$ cm

43. (a)

Sol. The cube is in equilibrium under three forces as,

(a) spring force kx, where x = elongation of the spring,



(b) gravitational force w, weight of the cube = mg

(c) buoyant force F_b (or upward thrust) imparted by the liquid on the cube given as $F_0 = Vdg$ where V = volume of the immersed portion of the cube. For complete immersion, V = volume of the cube.For equilibrium of the cube,

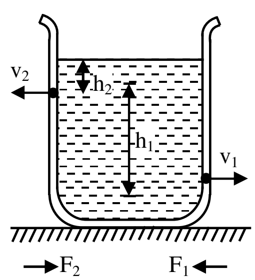
$kx + F_b = mg$

$\Rightarrow x = \frac{mg - F_b}{k} = \frac{mg - Vdg}{k}$ where V = (m/D)

$\Rightarrow x = \frac{mg}{k}\left(1 - \frac{d}{D}\right)$

44. (c)

Sol. Thrust force



$F = F_1 - F_2 = \rho a v_1^2 - \rho a v_2^2$

$= \rho a\,(2gh_1) - \rho a\,(2gh_2)$

$= 2\rho ag\,(h_1 - h_2)$

$= 2\,\rho agh$

45. (a)
Sol. Due to water flowing out from hole a force will acts on container towards left

46.(a)
Sol. $\Delta U = mg\left(\frac{h}{2}-\frac{h}{6}\right) = mg\ \frac{h}{3}$

$= Adhg.\ \frac{h}{3} \quad = \frac{Adh^2g}{3}$

47. (c)
Sol. at terminal velocity net force is zero.

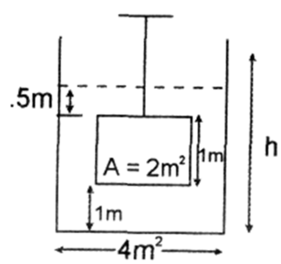
$6\pi\eta(r_1 + r_2)\ V_T+\frac{4}{3}\pi\ (r_1^3+r_2^3)\rho g=\frac{4}{3}\pi\ (r_1^3 + r_2^3)\ \sigma g$

48. (a)
Sol. Net force on the ball = 0
(when terminal velocity is attained).
Hence,
Weight = upthrust + viscous force

$\therefore\ \frac{4}{3}\ \pi r^3\ \rho_1 g = \frac{4}{3}\ \pi r^3\rho_2 g + krv_T$

$\therefore\ v_T = \frac{4\pi gr^2}{3k}\ (\rho_1 - \rho_2)$

49.(c)
Sol.



Pressure at the base of object = $P_0 + 1.5 \times 1000 \times 10$
$= 1.15 \times 10^5 N/m^2$ $F = 2 \times 1.15 \times 10^5 = 2.3 \times 10^5 N$

50.(d)
Sol. $T = V(\sigma - \rho)g = B - mg$ or $mg = B - T$
$mg = 0.65 \times 10^3 \times 10 - 900 = 5600N$ or $M = 560$ kg

51. (c)

Sol. $\overset{0}{P_4} + 3NaOH + 3H_2O \rightarrow \underset{\text{Sodium hypophosphite}}{3NaH_2PO_2} + \overset{-3}{PH_3}$.

It shows oxidation and reduction (Redox) properties.

52. (b)

Sol. SO_2 bleaches by reduction while chlorine bleaches colour of flowers by oxidation.

53. (c)

Sol. Number of e^- transferred in each case is 1, 3, 4, .

54. (a)

Sol. Starch paper are used for iodine test

as: $I^- + \text{oxidant} \longrightarrow I_2$

$I_2 + \text{starch} \longrightarrow \text{blue colour}$

55. (a)

Sol. $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$

$(Sn^{2+} \rightarrow Sn^{4+} + 2e^-) \times 3$

$Cr_2O_7^{2-} + 14H^+ + 3Sn^{2+} \rightarrow 3Sn^{4+} + 2Cr^{3+} + 7H_2O$

It is clear from this equation that 3 moles of Sn^{2+} reduce one mole of $Cr_2O_7^{2-}$, hence 1 mol. of Sn^{2+} will reduce $\frac{1}{3}$ moles of $Cr_2O_7^{2-}$.

56. (d)

Sol. Molecular weight of H_3PO_4 is 98 and change in

its valency $= 1$ equivalent wt. of H_3PO_4

$= \frac{\text{Molecular weight}}{\text{Change in valency}} = \frac{98}{1} = 98$.

57. (a)

Sol. $IO_3^- + aI^- + 6H^+ \longrightarrow cH_2O + dI_2$

step-1, $I^- \rightarrow I_2$ (Oxid^n), $IO_3^- \rightarrow I_2$ (Red^n)

step-II $2IO_3^- + 12H^+ \rightarrow I_2 + 6H_2O$

step-III, $2IO_3^- + 12H^+ + 10e^- \rightarrow I_2 + 6H_2O$

$2I^- \rightarrow I_2 + 2e^-$

step-IV, $2IO_3^- + 12H^+ + 10e^- \rightarrow I_2 + 6H_2O$

$[2I^- \rightarrow I_2 + 2e^-] \times 5$

step-V, $2IO_3^- + 10I^- + 12H^+ \rightarrow 6I_2 + 6H_2O$

$IO_3^- + 5I^- + 6H^+ \rightarrow 3I_2 + 3H_2O$

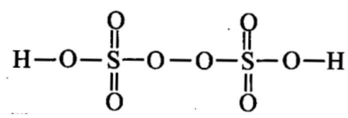
On comparing a = 5, b = 6, c = 3, d = 3

58. (d)

Sol. In metal carbonyls, metals have zero oxidation state.

59. (a)

Sol. $H_2S_2O_8$



Two oxygen atoms are involved in peroxide linkage, hence oxidation number will be – 1 (each)

$H_2S_2O_8 = 2\underset{H}{(+1)} + 2\underset{S}{(x)} + 2\underset{O-O}{(-1)} + 6\underset{O}{(-2)} = 0$

x = +6

60. (a)

Sol. H_2O_2 acts as an oxidizing as well as a reducing agent.

61. (a)

Sol. F_2 is the strongest oxidizing agent with highest reduction potential.

62. (b)

Sol. In NH_4NO_3, oxidation state of N in NH_4^+ is -3 while in NO_3^- is $+5$.

63. (c)

Sol. Oxidation state of F is fixed (-1) hence, it does not show disproportionation tendency.

64. (b)

Sol. $14H^+ + Cr_2O_7^{2-} + 3Ni \rightarrow 2Cr^{3+} + 7H_2O + 3Ni^{2+}$

$Ni \rightarrow Ni^{2+}$ (oxidation)

Hence, Ni acts as a reducing agent.

65. (a)

Sol. $\overset{0}{Cl}_{2(g)} + 2OH^-_{(aq)} \rightarrow \overset{+1}{Cl}O^-_{(aq)} + \overset{-1}{Cl^-}_{(aq)} + H_2O_{(l)}$

Chlorine is simultaneously reduced and oxidised.

66. (b)

Sol. Oxidation number of oxygen is -2 in most of its compounds. The exceptions are -1 in peroxides and -1/2 in superoxides, +2 in OF_2 and +1 in O_2F_2

67. (c)

Sol. It has four O atoms as peroxide with oxidation number = - 1 and one O atom with oxidation number = -2.

Hence, x + 4 (-1) + 1 (-2) = 0 or x = + 6

68. (c)

Sol. $\overset{+1}{H_2}O \rightarrow \overset{0}{H_2}$

Oxidation number of H decrease from +1 to 0 Hence H_2O is reduced to H_2

69. (c)

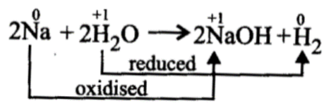
Sol. $2\overset{+7}{Mn}O_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2\overset{+2}{Mn}{}^{2+}$
$+10CO_2 + 8H_2O$

$MnO_4^- = x + 4(-2) = -1 \Rightarrow x = +7$

$Mn^{2+} = +2$

70. (c)

Sol.



71. (b)

Sol. Cu being more reactive than Ag due to lower electrode potential displaces Ag from $AgNO_3$ solution. It is dissolved in the solution in the form of Cu^{2+} ions.

72. (d)

Sol. Iron (Fe) does not react with cold water to give H_2. However, iron reacts with steam to give H_2.

73. (c)

Sol. pH of neutral water at room temperature is seven.

74. (b)

Sol. $\underset{0}{Cl_2} + H_2O_2 \rightarrow 2H\underset{-1}{Cl} + O_2$

In this reaction H_2O_2 works as reducing agent.

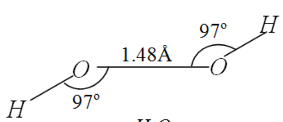
75. (a)

Sol. In the following reaction H_2O_2 acts as a reducing agent

$PbO_2(s) + H_2O_2(aq) \rightarrow PbO(s) + H_2O(l) + O_2(g)$

76. (d)

Sol.



H_2O_2

77. (b)

Sol. Copper being less reactive than hydrogen cannot displace hydrogen from acids.

78. (d)

Sol. B_2H_6 is electron deficient hydride

79. (c)

Sol. Only chromium from group 6 form CrH.

80. (a)

Sol. In liquid state, water molecules form two hydrogen bonds while in solid state (ice), it contains four H – bonds due to spatial arrangement of molecules to form an open cage like structure.

81. (a)

Sol. $CaC_2 + 2D_2O \rightarrow C_2D_2 + Ca(OD)_2$

82. (d)

Sol. Heavy water is used as a moderator in nuclear reactors to slow down the speed of fast moving (high energy) neutrons.

83. (b)

Sol. Heavy water has higher molecular mass than ordinary water Hence, its boiling point is little higher than water.

84. (c)

Sol. D_2O is prepared by repeated electrolysis of ordinary water which contains a small amount of alkali.

85. (b)

Sol. $H - 1s^1; He - 1s^2$

$x - ns^2np^5; Ne - 1s^2 2s^2 2p^6$

Both have one electron less than the nearest noble gas configuration.

SECTION-B

86. (b)

Sol. Tritium is ${}_1^3H$ having one proton and two neutrons.

It has no. of protons = 1, no of electrons =1,
no. of neutrons = 2.

87. (d)

Sol. In laboratory, hydrogen gas is prepared by action of dilute H_2SO_4 on granulated zinc.

$Zn + H_2SO_4(dil.) \rightarrow ZnSO_4 + H_2$

88. (c)

Sol. Since the water gas mixture $(CO + H_2)$ is used in synthesis of methanol and a number of other hydrocarbons, it is also called synthesis gas or syngas. The process of production of syngas from coal is known as coal gasification.

89. (d)

Sol. Elements of group 15-17 form electron rich hydrides. Group 14 elements form electron-precise hydrides.

90. (a)

Sol. Hydrogen has +1 oxidation state in compounds with more electronegative elements e.g., HF. It has -1 oxidation state in compounds with more electropositive compounds like NaH.

91. (a)

Sol. The water has maximum density at 4^0C when it is converted to ice, an open cage three dimensional structure is formed.

92. (d)

Sol.

$$Ca(HCO_3)_2 + Ca(OH)_2 \rightarrow \underset{(Insoluble)}{2CaCO_3} + 2H_2O$$

93. (a)

Sol. Permanent hardness of water is due to sulphates and chlorides of calcium and magnesium.

94. (b)

Sol. $Na_2Al_2Si_2O_8.xH_2O + Ca^{2+} (or\ Mg^{2+}) \rightarrow$

$CaAl_2Si_2O_8.xH_2O + 2Na^+$

95. (c)

Sol. The complex salt of metaphosphoric acid, sodium hexametaphosphate $(NaPO_3)_6$ is known as calgon. It is represented as $Na_2[Na_4(PO_3)_6]$

96. (a)

Sol. Zeolite/permutit is hydrated sodium aluminium silicate which is also written as NaZ.

97. (b)

Sol. There is extensive hydrogen bonding in solid state of water. Ice is a three dimensional hydrogen bonded structure.

98. (d)

Sol. H – O – H angle in water is slightly less than the typical tetrahedral angle. It is 104.5^0

99. (c)

Sol. Electrolysis of 50% sulphuric acid gives hydrogen peroxide.

100. (a)

Sol. Ortho and para hydrogen differ in Nuclear spin.

BOTANY									
Q.	ANS.	Q.	ANS.	Q.	ANS.	Q.	ANS.	Q.	ANS.
101	C	113	C	125	B	136	B	148	C
102	A	114	A	126	A	137	A	149	D
103	D	115	A	127	D	138	B	150	A
104	B	116	A	128	A	139	A		
105	C	117	D	129	C	140	C		
106	A	118	D	130	A	141	A		
107	B	119	D	131	C	142	C		
108	C	120	D	132	B	143	A		
109	B	121	C	133	B	144	B		
110	A	122	C	134	D	145	A		
111	C	123	B	135	B	146	D		
112	A	124	D			147	B		

ZOOLOGY									
Q.	ANS.	Q.	ANS.	Q.	ANS	Q.	ANS.	Q.	ANS
151	B	163	C	175	C	186	C	198	C
152	B	164	C	176	D	187	B	199	C
153	C	165	C	177	B	188	A	200	C
154	A	166	A	178	B	189	D		
155	A	167	D	179	B	190	B		
156	A	168	D	180	D	191	C		
157	C	169	D	181	D	192	C		
158	A	170	A	182	B	193	A		
159	B	171	C	183	D	194	B		
160	A	172	A	184	C	195	D		
161	C	173	D	185	A	196	A		
162	A	174	D			197	B		