1. (b)

Sol. LC = $\frac{1}{10}$ = 0.1 mm

zero error = + 6 × 0.1 = + 0.6 mm

2. (b)

Sol. $x^2 = (1500 - 10t)^2 + (1800 - 15t)^2$, for x to be minimum, its first derivative should be zero. Thus

dx/dt = 0

= -20 (1500 – 10t) – 30(1800 – 15t)

or t = 129.23 s

3. (d)

Sol. $T = \frac{2u_y}{g} = 2 \times \frac{9.8}{9.8} = 2s;$

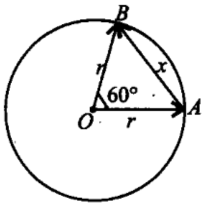
$x = \frac{1}{2}a_x t^2 = \frac{1}{2}(1)(2)^2 = 2m.$

4. (a)

Sol. 15^0, 30^0, 45^0, 60^0, 75^0. The greater the maximum height, the longer it takes the projectile to reach that altitude and then fall back down from it. So, as the launch angle increases, the time of flight increases.

5. (c)

Sol. According to cosine formula



$$\cos 60° = \frac{r^2 + r^2 - x^2}{2r^2}$$

$$2r^2 \cos 60° = 2r^2 - x^2$$

$$x^2 = 2r^2 - 2r^2 \cos 60° = 2r^2[1 - \cos 60°]$$

$$= 2r^2[2\sin^2 30°] = r^2$$

$\therefore x = r$

Displacement AB = x = r

6. (c)

Sol. $\frac{dv}{dt} = \frac{dv}{dx}.\frac{dx}{dt} = \frac{a}{2\sqrt{x}}(a\sqrt{x})h = \frac{a^2}{2}$

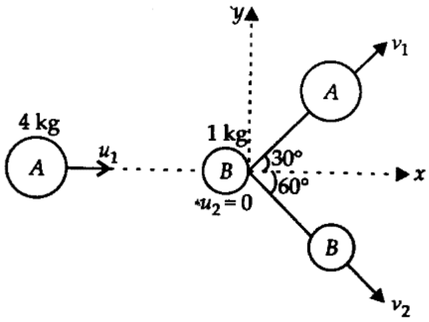
$\therefore$ F = $\frac{ma^2}{2}$

S = ut + $\frac{1}{2}ft^2 = 0 + \frac{a^2}{4}t^2$

W = F. s = $\frac{ma^4t^2}{8}$

7. (a)

Sol.



Applying the law of conservation of linear momentum along a direction perpendicular to the direction of motion (i.e. along y - axis), we get

$$0 + 0 = 4v_1 \sin 30^0 - v_2 \sin 60^0$$

$$4v_1 \sin 30^0 = v_2 \sin 60^0$$

$$\frac{v_1}{v_2} = \frac{\sin 60^0}{4\sin 30^0} = \frac{\sqrt{3}}{4}$$

8. (b)

Sol. ω

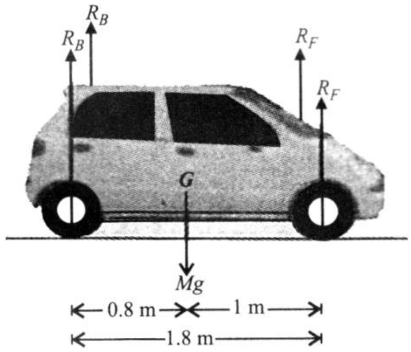
9. (a)

Sol. Here, mass of the car, M = 1800 kg

Distance between front and back axles = 1.8m

distance of gravity G behind the front axle = 1 m

Let R_F and R_B be the forces exerted by the level ground on each front wheel and each back wheel.



For translational equilibrium.

$$2R_F + 2R_B = Mg$$

Or $R_F + R_B = \frac{Mg}{2} = \frac{1800 \times 10}{2} = 9000N$ …. (i)

As there are two front wheels and two back wheels

For rotational equilibrium about G

$(2R_F(1) = (2R_B)(0.8)$

$\frac{R_F}{R_B} = 0.8 = \frac{8}{10} = \frac{4}{5} \Rightarrow R_F = \frac{4}{5}R_B$ ….. (ii)

Substituting this in Eq. (i), we get

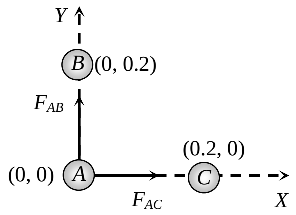
$\frac{4}{5}R_B + R_B = 9000 \text{ or } \frac{9}{5}R_B = 9000$

$R_B = \frac{9000 \times 5}{9} = 5000N$

$\therefore R_F = \frac{4}{5}R_B = \frac{4}{5} \times 5000N = 4000N)$

10. (a)

Sol. Let particle A lies at origin, particle B and C on y and x -axis respectively



$\overrightarrow{F_{AC}} = \frac{G m_A m_B}{r_{AB}^2}\hat{i}$

$= \frac{6.67 \times 10^{-11} \times 1 \times 1}{(0.2)^2}\hat{i} = 1.67 \times 10^{-9}\,\hat{i}\,N$

Similarly $\overrightarrow{F_{AB}} = 1.67 \times 10^{-9}\,\hat{j}\,N$

$\therefore$ Net force on particle A

$\vec{F} = \vec{F}_{AC} + \vec{F}_{AB} = 1.67 \times 10^{-9}(\hat{i} + \hat{j})\,N$

11. (d)

Sol. $mg' = mg\left(1 - \frac{2h}{R}\right) = 75 \times 10(1 - .185) = 610$ N

12. (b)

Sol. $k = Y \times r_0 = 2 \times 10^{11} \times 3.2 \times 10^{-10}$

$= 6.4 \times 10^1\,N/m$

$= 6.4 \times 10^{-9}\,N/Å$.

13. (c)

Sol. $Y = \frac{F\ell}{A\Delta\ell} = \frac{2Mg(1 - \cos\theta)L}{\pi\frac{d^2}{4}\Delta\ell}$

$[\because \frac{Mv^2}{2} = Mg\ell(1 - \cos\theta)$

$\Rightarrow \frac{Mv^2}{\ell} = 2Mg(1 - \cos\theta)]$

$1 - \cos\theta = \frac{Y\pi d^2\Delta\ell}{8Mg\ell} \Rightarrow \cos\theta = 1 - \frac{Y\pi d^2\Delta\ell}{8Mg\ell}$

14. (c)

Sol. Pressure at the bottom

$P = (h_1 d_1 + h_2 d_2)\frac{g}{cm^2}$

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

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

15. (d)

Sol. According to Bernoulli's theorem

$P_1 + \frac{1}{2}\rho v_1^2 = P_2 + \frac{1}{2}\rho v_2^2$

Or, $P_1 - P_2 = \frac{1}{2}\rho\left(v_2^2 - v_1^2\right)$

Or, $P_2 = P_1 - \frac{1}{2}\rho\left(v_2^2 - v_1^2\right)$

Given : $P_1 = 1500n/m^2$, $v_1 = 0.4m/s$, $v_2 = 0.6$ m/s, $P_2 = ?$

$\therefore P_2 = 1500 - \frac{1}{2} \times 1 \times 10^3\,[(0.6)^2 - (0.4)^2]$

Or, $P_2 = 1500 - 100 = 1400\,N/m^2$

16. (b)

Sol. Here, $P = 10\,kW = 10^4\,W, m = 8\,kg$

Time , $t = 2.5\,\text{minute} = 2.5 \times 60 = 150s$

Specific heat, $s = 0.9Jg^{-1}C^{-1}$

Total energy $= P \times t = 10^4 \times 150 = 15 \times 10^5\,J$

As 50% of energy is lost.

$\therefore$ Energy available,

$\Delta Q = \frac{1}{2} \times 15 \times 10^5 = 7.5 \times 10^5\,J$

As $\Delta Q = ms\Delta T$

$\Delta T = \frac{\Delta Q}{ms} = \frac{7.5 \times 10^5}{8 \times 10^3 \times 0.91} = 103\,°C$

17. (b)

Sol. $W_{12} = -\frac{nR(T_1 - T_2)}{\gamma - 1} = -\frac{RT_1(10^{\frac{\gamma-1}{\gamma}} - 1)}{\gamma - 1}$

$= -5600$ kJ

$W_{23} = 0$

$W_{31} = nRT_1 \ell n \left(\frac{V}{V/10}\right) = RT_1 \ln 10 = 5552.67$ J

$\therefore \Delta Q = W_{net} = -47.33$ J

18. (b)

Sol. At lower pressure we can assume that given gas behaves as ideal gas so $\frac{PV}{RT} = $ constant but when pressure increase, the decrease in volume will not take place in same proportion so $\frac{PV}{RT}$ will increases.

19. (b)

Sol. $x = v_0 t$

$\vec{r} = x\hat{i} + y\hat{j}$

$\vec{v} = \frac{d\vec{r}}{dt} = \frac{dx}{dt}\hat{i} + \frac{dy}{dt}\hat{j}$

$= \frac{dx}{dt}\hat{i} + Akv_0 \cos v_0 t\, k\, \hat{j}$

$\frac{d\vec{v}}{dt} = -Ak^2 v_0^2 \sin v_0 t\, k\, \hat{j}$

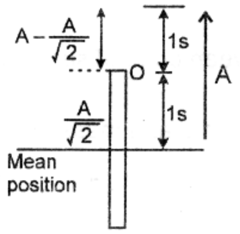
at $x = \frac{\pi}{2k}$,

$\vec{v} = \frac{dx}{dt}\hat{i} = v_0\hat{i}$

$\vec{a} = -Ak^2 v_0^2$

20. (c)

Sol. Time period of motion = 6 + 2 = 8s



from mean position to the highest point of the wall, it takes 1s

and covers distance $\frac{A}{\sqrt{2}}$

Thus $A - \frac{A}{\sqrt{2}} = 0.3$ m

$\Rightarrow A = 1.0$ m

21. (b)

Sol. $v \propto n \propto \sqrt{T}$ because λ = constant

$\frac{N+4}{N+1} = \sqrt{\frac{324}{289}} = \frac{18}{17}$

$17N + 68 = 18N + 18$

$50 = N$

22. (b)

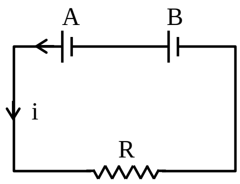
Inside pressure must be $\frac{4T}{r}$ greater than outside pressure in bubble. This excess pressure is provided by charge on bubble.

$\frac{4T}{r} = \frac{\sigma^2}{2\epsilon_0}$

$\frac{4T}{r} = \frac{Q^2}{16\pi^2 r^4 \times 2\epsilon_0} \ldots \left[\sigma = \frac{Q}{4\pi r^2}\right]$

$Q = 8\pi r\sqrt{2rT\epsilon_0}$

23. (a)



$i = \frac{12}{R+5}$

potential difference across A = 0

$6 - \frac{12 \times 3}{R+5} = 0$

$R = 1\ \Omega$

24. (a)

Sol. As, $R = \rho\frac{l}{A}$, resistance is maximum when l is large and A is least. For the given dimensions of wire, resistance will be maximum for l = 10 cm and

$A = 1\text{cm} \times \frac{1}{2}\text{cm}.$

25. (d)

Sol. $\tau_{max} = MB$ or $\tau_{max} = ni\pi a^2 B$. Let number of turns in length

l is n so $l = n(2\pi a)$ or $a = \frac{l}{2\pi n}$

$\Rightarrow \tau_{max} = \frac{ni\pi B l^2}{4\pi^2 n^2} = \frac{l^2 iB}{4\pi n_{min}} \Rightarrow \tau_{max} \propto \frac{1}{n_{min}}$

$\Rightarrow n_{min} = 1$

26. (b)

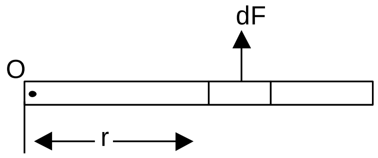
Sol. The force acting on the elementary portion of the current carrying conductor is given as,

$dF = i(d\ell)B \sin 90^0 \Rightarrow dF = iBdr$

The torque applied by dF about O = $d\tau = rdF$

$\Rightarrow$ The total torque about O = $\tau \int d\tau = \int r(iBdr)$

$$\Rightarrow \tau = iB\int_0^L rdr = \frac{iBL^2}{2}$$



The angular acceleration $\alpha = \frac{\tau}{M.I.}$ (Where M.I. = moment of inertia)

$$\Rightarrow \alpha = \left(\frac{iBL^2}{2}\right) \Big/ \left(\frac{mL^2}{3}\right)$$

$$\Rightarrow \alpha = \frac{3iB}{2m}.$$

Hence (B) is correct.

27. (d)

Sol. By using $\frac{M_1}{M_2} = \frac{T_d^2 + T_s^2}{T_d^2 - T_s^2}$; where

$T_s = \frac{60}{12} = 5\,sec$ and

$T_d = \frac{60}{4} = 15\,sec \quad \therefore \frac{M_1}{M_2} = \frac{(15)^2 + (5)^2}{(15)^2 - (5)^2} = \frac{5}{4}$

28. (b)

Sol. In series connection

$L_1 + L_2 = 10\,H$ ….. (i)

And parallel connection

$\frac{L_1 L_2}{(L_1 + L_2)} = 2.4H \cdots$ (ii)

Substituting the value of $(L_1 + L_2)$ from (i) into (ii), we get

$L_1 L_2 = (2.4)(L_1 + L_2) = 2.4 \times 10 = 24$

$(L_1 - L_2)^2 = (L_1 + L_2)^2 - 4L_1 L_2$

$L_1 - L_2 = [(10)^2 - 4 \times 24]^{1/2} = 2H$ …… (iii)

Solving (i) and (iii), we get

$L_1 = 6H,\ L_2 = 4H$

29. (a)

Sol. Here, $\upsilon = 0.5\,Hz$, $N = 200$, $A = 0.1m^2$

$B = 0.02\ T$

maximum voltage generated is

$\varepsilon_0 = NBA(2\pi\upsilon)$

$= 200 \times 0.02 \times 0.1(2\pi \times .05) = 1.26V$

30. (d)

Sol. Use $P_{av} = \left(\frac{V_{rms}}{Z}\right)^2 R$

31. (b)

Sol. $Q = \frac{1}{R}\sqrt{\frac{L}{C}}$

32. (d)

Sol. f = R/2

$\therefore$ f = + 20 cm, u = – 20 cm, h_0 = 2 mm

$m = \frac{h_i}{h_0} = \frac{f}{f - u} \quad \therefore \frac{h_i}{2} = \frac{20}{20 - (-20)}$

h_i = 1 mm

33. (d)

Sol. $\frac{1}{80} = \frac{1}{20} + \frac{1}{f}$

$\therefore \frac{1}{f} = \frac{1}{80} - \frac{1}{20}$

$\therefore f = \frac{-80}{3}$ cm $= -\frac{4}{15}$ m

$\therefore P = -\frac{15}{4}$ D = – 3.75 D

34. (b)

Sol. By using $\Delta\lambda = \lambda\frac{v}{c} \Rightarrow$ (3737-3700)= $3700 \times \frac{v}{3 \times 10^8}$

$\Rightarrow v = 3 \times 10^6\ m/s$.

35. (c)

Sol. The limit of resolution of a microscope is $d = \frac{\lambda}{2\sin\theta}$ where 2θ is the angle of cone of light rays entering the objective of the microscope.

Here, $\lambda_1 = 5000$ Å

For electrons accelerated through 100 V, de Broglie wavelength,

$$\lambda_2 = \frac{12.27}{\sqrt{100}} \text{Å} = 1.227 \text{ Å}$$

As $(2\sin\theta)$ is same in the two cases, therefore,

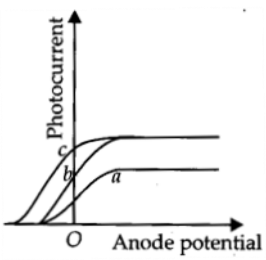
$$\frac{d_1}{d_2} = \frac{\lambda_1}{\lambda_2} = \frac{5000}{1.227} = 4075$$

36. (d)

Sol. If wavelength becomes halved than maximum KE becomes more than double.

37. (a)

Sol. From the graph, we note that the saturation current is same for curves b and c but different for curve a. therefore intensities of b and c will be equal but different from that of a i.e. $I_a \neq I_b$ but $I_b = I_c$ As stopping potential is same for curves a and b hence $\upsilon_a = \upsilon_b$ thus answer (a) is correct



38. (c)

Sol. Using $\frac{1}{\lambda} = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$

$$\Rightarrow \frac{1}{975 \times 10^{-10}} = 1.097 \times 10^7 \left(\frac{1}{1^2} - \frac{1}{n^2}\right)$$

$\Rightarrow$ n = 4

Now number of spectral lines $N = \frac{n(n-1)}{2} = \frac{4(4-1)}{2} = 6$.

39. (a)

Sol. n > 4

$= 2(1)^2 + 2(2)^2 + 2(3)^2 + 2(4)^2$

= 2 + 8 + 18 + 32

= 60

40. (c)

Sol. ${}^{27}_{12}\text{Mg} \rightarrow {}^{27}_{13}\text{A}\ell + e^- + \bar{\nu}$

Beta decay in which isotope ${}^{27}_{12}\text{Mg}$ is converted to an isotope of aluminum ${}^{27}_{13}\text{A}\ell$.

41. (b)

Sol. $n = \frac{t}{T_{1/2}} = \frac{3240}{1620} = 2$

As $\frac{N}{N_0} = \frac{m}{m_0} = \left(\frac{1}{2}\right)^n$

Mass of radium left after 2 half lives is

$$m = m_0\left(\frac{1}{2}\right)^n = 1 \times \left(\frac{1}{2}\right)^2 = \frac{1}{4} = 0.25\,mg$$

Mass of radium disintegrated $= 1 - 0.25 = 0.75\,mg$

Number of radium atoms disintegrated

$= 0.75 \times 2.68 \times 10^{18} = 2.01 \times 10^{18}$

42. (c)

Sol. From PV = μRT.

At a given temperature, the ratio masses of air

$$\frac{\mu_1}{\mu_2} = \frac{P_1V_1}{P_2V_2} = \frac{\left(P + \frac{4T}{R_1}\right)\frac{4}{3}\pi R_1^3}{\left(P + \frac{4T}{R_2}\right)\frac{4}{3}\pi R_2^3} = \frac{\left(P + \frac{4T}{R_1}\right)R_1^3}{\left(P + \frac{4T}{R_2}\right)R_2^3}.$$

43. (c)

Sol. A- (r), B- (p), C- (q), D-(s)

44. (d)

Sol. As $E = \frac{V}{l} = \frac{2V}{0.1m} = 20Vm^{-1}$

$A = 1.0\,cm^2 = 1.0 \times 10^{-4} m^2$

$v_e = \mu_e E = 0.14 \times 20 = 2.8\,ms^{-1}$

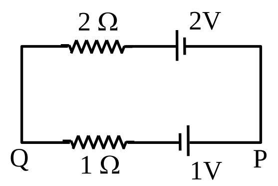
The electron current is

$I_e = n_e A v_e$

$= (1.5 \times 10^{16}) \times (1.0 \times 10^{-4}) \times (1.6 \times 10^{-19}) \times 2.8$

$= 6.72 \times 10^{-7} A$

45. (a)



$$E_{net} = \frac{E_1 r_2 - E_2 r_1}{r_1 + r_2} = \frac{2-2}{2+1} = 0$$

46. (d)

Sol. For $Li^{3+}\ \bar{v} = \bar{v}$ for $H \times z^2$ =15200 ×9= 1,36800 cm^{-1}

47. (b)

Sol. Rydberg's formula for calculation of wavenumbers of lines in hydrogen spectrum is

$$\bar{\upsilon} = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

For Balmer series, $n_1 = 2$ and $n_2 = 3, 4, 5,$ so third line of the Balmer series is due to transition from fifth Bohr orbit to second Bohr orbit.

48. (a)

Sol. Palladium and vanadium form non-stoichiometric (or interstitial) hydrides.

49. (b)

Sol. Due to higher electronegativity the extent of hydrogen bonding is quite appreciable.

50. (c)

Sol. $B_2H_6 + 6Cl_2 \longrightarrow 2BCl_3 + 6HCl$.

51. (c)

Sol. Electronic configuration of $Al - 1s^2 2s^2 2p^6 3s^2 3p^1$

Electronic configuration of $Mg - 1s^2 2s^2 2p^6 3s^2$

It is difficult to remove electron from paired $3s^2$-orbital than unpaired $3p^1$ Hence, I.E. of Al is lower than Mg.

52. (c)

Sol.

53. (d)

Sol. (A)→ (iii), (B) → (iv), (C) → (ii), (D) → (i)

54. (d)

Sol. c > d > b > a

(ee) (ea) (e,a) (a,a)

Largest group & most of the group should be at equatorial position.

55. (a)

Sol. Nucleophilicity $\propto$ size [in a group].

56. (a)

Sol. Chlorofluorocarbons (CFCs or freons like CF_2Cl_2) are responsible for depletion of the ozone layer in the upper strata of atmosphere. They are stable and inert compounds. They absorb UV rays and break down liberating free atomic chlorine which causes depletion of ozone through free radical reaction.

$$\dot{Cl} + O_3 \rightarrow Cl\dot{O} + O_2$$

$$Cl\dot{O} + O_3 \rightarrow \dot{Cl} + 2O_2$$

57. (a)

Sol. (A)→(ii), (B)→(iii), (C) →(iv),(D) →(i)

58. (a)

Sol. For bcc structure,

Atomic radius, r = $\frac{\sqrt{3}}{4}$ a = $\frac{\sqrt{3}}{4}$ × 4.3 = 1.86

we know that, r = half the distance between two nearest neighbouring atoms.

∴ shortest interionic distance = 2 × 1.86 = 3.72

59. (c)

Sol. Distance between nearest neighbours is along the face diagonal = $\frac{a\sqrt{2}}{2}$.

60. (d)

Sol. According to Henry's law $s = k_H \times p$ where s is concentration of O_2 dissolved.

$$s = 1.4 \times 10^{-3} \times 0.5 = 0.7 \times 10^{-3} \text{ mol / L}$$

$$s = \frac{n}{V} \text{ or } n = 0.7 \times 10^{-3} \times 0.1 = 0.7 \times 10^{-4} \text{ mol}$$

$$n = \frac{w}{M} \text{ or } w = n \times M$$

$$= 0.7 \times 10^{-4} \times 32 = 22.4 \times 10^{-4} g \text{ or } 2.24 \text{ mg}$$

61. (d)

Sol. Vapour pressure of a solution containing non volatile solute is less than that of the pure solvent. The decrease in vapour pressure depends upon the quantity of non volatile solute present in it. Hence, vapour pressure of A > C > B

62. (b)

Sol.

63. (b)

Sol. The charging reaction in the lead storage battery is

$2PbSO_4 + 2H_2O \longrightarrow Pb + PbO_2 + 2H_2SO_4$.

64. (b)

Sol. Slowest step is the r.d.s.

65. (c)

Sol. $A \longrightarrow$ product

For zero order reaction

$t_{1/2} \propto \frac{1}{a^{n-1}}$ a = initial concentration of reactant

$t_{1/2} \propto a$

$\frac{(t_{1/2})_1}{(t_{1/2})_2} = \frac{a_1}{a_2}; \frac{1}{(t_{1/2})_2} = \frac{2}{0.50}$

$t_{1/2} = \frac{0.5}{2} = 0.25$ h.

66. (a)

Sol. Adsorptions does not keep increasing continuously with increase in pressure.

67. (c)

Sol. (A)$\rightarrow$(iii), (B) $\rightarrow$(i), (C) $\rightarrow$(iv), (D) $\rightarrow$ (ii)

68. (d)

Sol. (A)$\rightarrow$(ii), (B)$\rightarrow$(i), (C)$\rightarrow$(iv), (D)$\rightarrow$(iii)

69. (d)

Sol. Orbitals bearing lower value of n will be more closer to the nucleus and thus electrons will experience greater attraction from nucleus and so its removal will be difficult, not easier.

70. (a)

Sol. In a period from left to right density first increases upto the middle and then starts decreasing.

71. (a)

Sol. Let the mass of methane and oxygen be m gm. Mole fraction of oxygen x_{O2}

$= \frac{\frac{m}{32}}{\frac{m}{32} + \frac{m}{16}} = \frac{m}{32} \times \frac{32}{3m} = \frac{1}{3}$

Let the total pressure be P.

$\therefore$ Partial pressure of O_2, $P_{O2} = P \times x_{O2}$

$P \times \frac{1}{3} = \frac{1}{3}$ P.

72. (a)

Sol.

73. (d)

Sol.

74. (d)

Sol. More positive the value of E^o greater is the tendency of the species to get reduced. On the basis of the given E^o values, Br_2 is having highest E^o value $(+1.90)$ hence, Cu will easily reduce Br_2

75. (c)

Sol. Lithium when burnt in air forms a mixture of oxdide as well as nitride.

$4Li + O_2 \xrightarrow{\Delta} 2Li_2O, 6Li + N_2 \xrightarrow{\Delta} 2Li_3N$

76. (c)

Sol. Carbonates and sulphates of lithium decomposes on heating while the stability of carbonates and sulphates of other metals increases down the group.

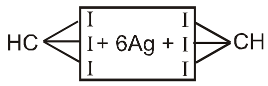
77. (a)

Sol. $CH \equiv CH \xrightarrow{2HOCI} \underset{OH}{\overset{OH}{CH}} - CHCI_2 \xrightarrow{-H_2O}$

$H - \underset{O}{\underset{\|}{C}} - CHCI_2$

78. (d)

Sol.



$\longrightarrow$ CH⁰CH + 6AgI

79. (d)

Sol. N_3^-, $(CNO)^-$ and $(NCN)^{2-}$ all have same number of electrons i.e., 22 ; so all are isoelectronic with CO_2 which also has 22 electrons.

80. (d)

Sol. (a) As δ^+ charge on central atom increases, the attraction between δ^+ and δ^- increases and thus Xe–F bond length decreases. The correct order is $XeF_2 > XeF_4 > XeF_6$

(b) PH_5 can not undergo sp^3d hybridisation as there is much large difference in size of s, p and d orbitals. PH_5 does not exist as no partial positive charge develops on P atom.

(c) Dipole moment of CH_3Cl is greater than CH_3F due to greater charge sepration on carbon and chlorine atoms in CH_3Cl.

(d) it is a correct order.

The strength of hydrogen bond depends upon :

(i) size (ii) electronegativity and (iii) ease of donation of electron pair by electronegative element.

Higher the value of electronegativity and smaller the size of the covalently bonded atom to H atom stronger is the hydrogen bonding.

81. (b)

Sol. Molar mass of $O_2 = 32\,g\,mol^{-1}$

$32\,g\,of\,O_2 = 6.023\times10^{23}$ molecules

$40\,g\,of\,O_2 = \frac{6.023\times10^{23}\times40}{32} = 7.529\times10^{23}$

molecules

Mass of 6.023×10^{23} molecules of $CO_2 = 44\,g$

Mass of 7.529×10^{23} molecules of CO_2

$= \frac{44\times7.529\times10^{23}}{6.023\times10^{23}} = 55\,g$

82. (d)

Sol.

Element	%	No. of moles	Mole Ratio	Whole No.ratio
P	27.3	27.3/12 = 2.27	1	1
Q	72.7	72.7/16 = 4.54	2	2

Empirical formula = PQ_2

83. (b)

Sol. $n_{C_2H_4} = \frac{6226}{1411} = 4.41$

$C_2H_4 + 3O_2 \longrightarrow 2CO_2 + 2H_2O$

4.41

$V_{O_2} = 4.41 \times 3 \times 22.4 = 296.3$ L

84. (c)

Sol. At constant volume $\Delta U = q_V = nC_{vm}$

$\Delta T = \frac{3}{2}R \times 300 = 450\,R$

at constant pressure $\Delta H = q_P = nC_{p,m}$

$\Delta T = \frac{5}{2}R\,(-150) = -375\,R$

85. (c)

$2X + 3Y \longrightarrow X_2Y_3$

weight W gram   W gram 0

Mole $\frac{w}{36}$ $\frac{w}{24}$

L.R. $\rightarrow$ $\frac{w}{36}\times\frac{1}{2}$ $\frac{w}{24\times3}$

No. one is L.R. $\frac{1}{72}$ $\frac{1}{72}$

$2X + 3Y \longrightarrow X_2Y_3$

$\frac{w}{36}$ $\frac{w}{24}$

$\frac{w}{2[36]}$

weight of $X_2Y_3 = \frac{w}{2\times36}$ $[72 \times 2] = 2\,w$

So weight of X_2Y_3 = 2 [weight of X Taken]

86. (a)

Sol. On the basis of hyperconjugation, the order of stability of free radicals is as follows t > s > p. Benzyl free radicals are stabilized by resonance and hence are more stable than alkyl free radicals. More the number of phenyl groups attachend to the carbon atom, more is the stability of free radical.

87. (b)

Sol. $pK_w = 13.4$ means for neutral sol

$[H^+] = [OH^-] = 10^{-6.7}$

i.e. pH = 6.7 pH > 6.7 means basic solution.

88. (a)

Sol. For acidic buffer, $pH = pK_a + \frac{[A^-]}{[HA]}$

when the acid is 50% ionised, $[A^-] = [HA]$

or $pH = pK_a + \log 1$ or $pH = pK_a$

given $pK_a = 4.5$

$\therefore$ pH = 4.5 $\therefore$ pOH = 14 – 4.5 = 9.5.

89. (d)

Sol.

$$\Delta G^0 = -2.303RT \log K_p = -2.303 \times 8.314 \times 10^{-3} \times 298 \log K_p$$

$$1.7 = -2.303 \times 8.314 \times 10^{-3} \times 298 \log K_p$$

$$K_p = 0.5$$

90. (d)

Sol. If the temperature is decreased and pressure is increased then reactions proceeds in forward reaction.

SAFE HANDS & IIT-ian's PACE

MOCK TEST # 04 (NEET) SOLUTIONS

BIOLOGY ANSWER KEY

91- d	122-c	153-C
92 -d	123-c	154-d
93- b	124-c	155-d
94- a	125-b	156-d
95- b	126-a	157-b
96- d	127-b	158-c
97- d	128- BONUS	159-a
98- d	129-b	160-b
99- a	130-d	161-b
100- a	131-b	162-d
101- d	132-d	163-a
102- a	133-b	164-d
103- c	134-d	165-c
104- d	135-d	166-d
105- d	136-a	167-c
106- a	137-c	168-a
107- c	138-a	169-b
108- a	139-c	170-d
109- d	140-b	171-c
110- d	141-d	172-c
111- d	142-d	173-b
112- a	143-d	174-c
113- c	144-d	175-b
114-d	145-C	176-b
115-b	146-a	177-d
116-c	147-c	178-b
117-d	148-d	179-d
118-c	149-d	180-a
119-a	150-b	
120-d	151-d	
121-c	152-c	