ANSWERS KEY

NEET-2017(Code-A)

Date : 07.05.2017

1. (3)	24. (3)	47. (3)	70. (4)	93. (2)	116. (4)	139. (3)	162. (4)
2. (4)	25. (4)	48. (3)	71. (2)	94. (2)	117. (4)	140. (1)	163. (4)
3 (2)	26. (1)	49. (2)	72. (2)	95. (2)	118. (1)	141. (3)	164. (2)
4. (4)	27. (2)	50. (1,4)	73. (1)	96. (3)	119. (1)	142. (3)	165. (3)
5. (1)	28. (1)	51. (4)	74. (4)	97. (2)	120. (2)	143. (2)	166. (3)
6. (2)	29. (4)	52. (2)	75. (2)	98. (1)	121. (1)	144. (1)	167. (1)
7. (1)	30. (2)	53. (4)	76. (2)	99. (4)	122. (1)	145. (4)	168. (4)
8. (3*)	31. (2)	54. (4)	77. (2)	100. (2)	123. (3)	146. (3)	169. (2)
9. (3)	32. (4)	55. (4)	78. (4)	101. (3)	124. (3)	147. (2)	170. (3)
10. (3)	33. (3)	56. (1)	79. (3)	102. (2)	125. (2)	148. (1)	171. (1)
11. (1)	34. (4)	57. (4)	80. (1)	103. (2)	126. (4)	149. (2)	172. (3)
12. (2)	35. (4)	58. (2)	81. (2)	104. (4)	127. (1)	150. (3)	173. (4)
13. (3)	36. (2)	59. (4)	82. (2)	105. (4)	128. (1)	151. (1)	174. (3)
14. (4)	37. (3)	60. (3)	83. (3)	106. (1)	129. (3)	152. (2)	175. (1)
15. (3)	38. (3)	61. (3)	84. (3)	107. (2)	130. (3)	153. (3)	176. (3)
16. (2)	39. (2)	62. (2)	85. (4)	108. (3)	131. (3)	154. (2)	177. (1)
17. (2)	40. (3)	63. (3)	86. (2)	109. (1)	132. (1)	155. (1)	178. (3)
18. (1,2)	41. (3)	64. (4)	87. (2)	110. (2)	133. (2)	156. (3)	179. (3)
19. (1)	42. (1)	65. (2)	88. (4)	111. (4)	134. (3)	157. (1)	180. (3)
20. (4)	43. (2)	66. (3)	89. (1)	112. (2)	135. (4)	158. (3)	
21. (3)	44. (2)	67. (2)	90. (4)	113. (2)	136. (4)	159. (3)	
22. (1)	45. (3)	68. (3)	91. (4)	114. (4)	137. (4)	160. (3)	
23. (3)	46. (4)	69. (1)	92. (1)	115. (2)	138. (4)	161. (2)	

NEET-2017Solution (Code-A)

PHYSICS

1. **(3)**

Reading of potentiometer is accurate because during taking reading it does not draw any current from the circuit.

2. **(4)**

$$U = n_1\frac{f_1}{2}RT + n_2\frac{f_2}{2}RT$$

$$= 2\times\frac{5}{2}RT + 4\times\frac{3}{2}RT$$

$$= 5\,RT + 6\,RT$$

$$U = 11\,RT$$

3 (2)

No option is correct

If we take $\frac{N_A}{N_B} = \frac{1}{e}$

Then

$$\frac{N_A}{N_B} = \frac{e^{-8\lambda t}}{e^{-\lambda t}}$$

$$\frac{1}{e} = e^{-7\lambda t}$$

$$-1 = -7\lambda t$$

$$t = \frac{1}{7\lambda}$$

4. (4)

$$h_{oil}\,\rho_{oil}\,g = h_{water}\,\rho_{water}\,g$$

$$140 \times \rho_{oil} = 130 \times \rho_{water}$$

$$\rho_{oil} = \frac{13}{14}\times 1000\ \text{kg/m}^3$$

$$\rho_{oil} = 928\ \text{kg m}^{-3}$$

5. (1)

$W = MB\,(\cos\theta_1 - \cos\theta_2)$

When it is rotated by angle 180º then

$W = 2MB$

$W = 2\,(NIA)B$

$= 2 \times 250 \times 85 \times 10^{-6}[1.25 \times 2.1 \times 10^{-4}] \times 85 \times 10^{-2}$

$= 9.1\ \mu J$

6. (2)

de-Broglie wavelength

$$\lambda = \frac{h}{mv}$$

$$= \frac{h}{\sqrt{2m(KE)}}$$

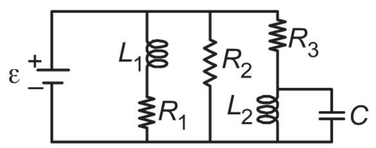
$$= \frac{h}{\sqrt{2m(\frac{3}{2}kT)}}$$

$$\lambda = \frac{h}{\sqrt{3mkT}}$$

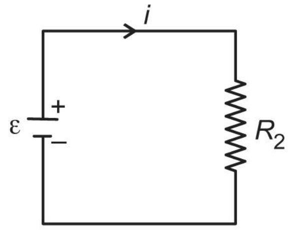
7. (1)

Centripetal force $\left(\frac{mv^2}{l}\right)$ is provided by tension so the net force will be equal to tension i.e., T.

8. (3*)



At t = 0, no current flows through R_1 and R_3

∴


$$i = \frac{\varepsilon}{R_2}$$

$$= \frac{18}{9}$$

$$= 2\ A$$

Note : Not correctly framed but the best option out of given is (3).

9. (3)

$x = 5t - 2t^2$ $y = 10t$

$\frac{dx}{dt} = 5 - 4t$ $\frac{dy}{dt} = 10$

$v_x = 5 - 4t$ $v_y = 10$

$\frac{dv}{dt}x = -4$ $\frac{dv}{dt}y = 10$

$a_x = -4$ $a_y = 0$

Acceleration of particle at t = 2 s is = –4 m/s^2

10. (3)

$F_e = F_g$

$$\frac{1}{4\pi\varepsilon_0}\frac{\Delta e^2}{d^2} = \frac{Gm^2}{d^2}$$

$9 \times 10^9 (\Delta e^2) = 6.67 \times 10^{-11} \times 1.67 \times 10^{-27} \times 1.67 \times 10^{-27}$

$$\Delta e^2 = \frac{6.67 \times 1.67 \times 1.67}{9} \times 10^{-74}$$

$\Delta e \approx 10^{-37}$

11. (1)

Thermal current

$H = H_1 + H_2$

$$= \frac{K_1A(T_1 - T_2)}{d} + \frac{K_2A(T_1 - T_2)}{d}$$

$$\frac{K_{EQ}2A(T_1 - T_2)}{d} = \frac{A(T_1 - T_2)}{d}[K_1 + K_2]$$

$$K_{EQ} = \left[\frac{K_1 + K_2}{2}\right]$$

12. (2)

Work done w = qΔV

ΔV is same in all the cases so work is done will be same in all the cases.

13. (3)

For last Balmer series

$$\frac{1}{\lambda_b} = R\left[\frac{1}{2^2} - \frac{1}{\infty^2}\right]$$

$$\lambda_b = \frac{4}{R}$$

For last Lyman series

$$\frac{1}{\lambda_l} = R\left[\frac{1}{1^2} - \frac{1}{\infty^2}\right]$$

$$\lambda_l = \frac{1}{R}$$

$$\frac{\lambda_b}{\lambda_l} = \frac{\frac{4}{R}}{\frac{1}{R}}$$

$$\frac{\lambda_b}{\lambda_l} = 4$$

14. (4)

$$X_1 = X_{5\text{th dark}} = (2 \times 5 - 1)\frac{\lambda D}{2d}$$

$$X_2 = X_{8\text{th bright}} = 8\frac{\lambda D}{\mu d}$$

$X_1 = X_2$

$$\frac{9}{2}\frac{\lambda D}{d} = 8\frac{\lambda D}{\mu d}$$

$$\mu = \frac{16}{9} = 1.78$$

15. (3)

$v = \omega\sqrt{A^2 - x^2}$

$a = x\omega^2$

$v = a$

$\omega\sqrt{A^2 - x^2} = x\omega^2$

$$\sqrt{(3)^2 - (2)^2} = 2\left(\frac{2\pi}{T}\right)$$

$$\sqrt{5} = \frac{4\pi}{T}$$

$$T = \frac{4\pi}{\sqrt{5}}$$

16. (2)

Process

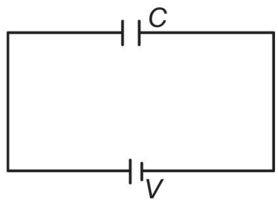
I = Isochoric

II = Adiabatic

III = Isothermal

IV = Isobaric

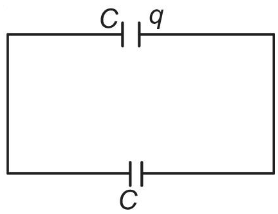
17. (2)



Charge on capacitor

$q = CV$

when it is connected with another uncharged capacitor.



$$V_c = \frac{q_1 + q_2}{C_1 + C_2} = \frac{q + 0}{C + C}$$

$$V_c = \frac{V}{2}$$

Initial energy

$$U_i = \frac{1}{2}CV^2$$

Final energy

$$U_f = \frac{1}{2}C\left(\frac{V}{2}\right)^2 + \frac{1}{2}C\left(\frac{V}{2}\right)^2$$

$$= \frac{CV^2}{4}$$

Loss of energy = $U_i - U_f$

$$= \frac{CV^2}{4}$$

i.e. decreases by a factor (2)

18. (1,2) both are answers are correct.

$\lambda_0 = 3250 \times 10^{-10}$ m

$\lambda = 2536 \times 10^{-10}$ m

$$\phi = \frac{1242 \text{ eV-nm}}{325 \text{ nm}} = 3.82 \text{ eV}$$

$$h\nu = \frac{1242 \text{ eV-nm}}{253.6 \text{ nm}} = 4.89 \text{ eV}$$

$KE_{max} = (4.89 - 3.82)$ eV = 1.077 eV

$$\frac{1}{2}mv^2 = 1.077 \times 1.6 \times 10^{-19}$$

$$v = \sqrt{\frac{2 \times 1.077 \times 1.6 \times 10^{-19}}{9.1 \times 10^{-31}}}$$

$v = 0.6 \times 10^6$ m/s

19. (1)

Let $\frac{e^2}{4\pi\varepsilon_0} = A = ML^3T^{-2}$

$l = C^x G^y (A)^z$

$L = [LT^{-1}]^x [M^{-1}L^3T^{-2}]^y [ML^3T^{-2}]^z$

$-y + z = 0 \Rightarrow y = z$ ...(i)

$x + 3y + 3z = 1$ ...(ii)

$-x - 4z = 0$ ...(iii)

From (i), (ii) & (iii)

$$z = y = \frac{1}{2},\ x = -2$$

20. (4)

$$f_A = f\left[\frac{v + v_o}{v - v_s}\right]$$

$$= 400\left[\frac{340 + 16.5}{340 - 22}\right]$$

f_A = 448 Hz

21. (3)

Current gain (β) = 100

Voltage gain (A_V) = $\beta\frac{R_c}{R_b}$

$$= 100\left(\frac{3}{2}\right)$$

= 150

Power gain = $A_V\ \beta$

= 150 (100)

= 15000

22. (1)

In forward bias, p-type semiconductor is at higher potential w.r.t. n-type semiconductor.

23. (3)

Spring constant $\propto \frac{1}{\text{length}}$

$k \propto \frac{1}{l}$

i.e, $k_1 = 6k$

$k_2 = 3k$

$k_3 = 2k$

In series

$\frac{1}{k'} = \frac{1}{6k} + \frac{1}{3k} + \frac{1}{2k}$

$\frac{1}{k'} = \frac{6}{6k}$

$k' = k$

$k'' = 6k + 3k + 2k$

$k'' = 11k$

$\frac{k'}{k''} = \frac{1}{11}$ i.e $k' : k'' = 1 : 11$

24. (3)

$Y = \overline{A + B}$

25. (4)

Above earth surface	Below earth surface
$g' = g\left(1 - \frac{2h}{R_e}\right)$	$g' = g\left(1 - \frac{d}{R_e}\right)$
$\Delta g' = g\frac{2h}{R_e}$ ...(1)	$\Delta g = g\frac{d}{R_e}$ ...(2)
From (1) & (2)	

$d = 2h$

$d = 2 \times 1$ km

26. (1)

Centre of mass may or may not coincide with centre of gravity.

27. (2)

$\beta = \frac{1-\eta}{\eta}$

$= \frac{1 - \frac{1}{10}}{\frac{1}{10}} = \frac{\frac{9}{10}}{\frac{1}{10}}$

$\beta = 9$

$\beta = \frac{Q_2}{W}$

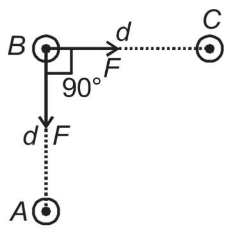
$Q_2 = 9 \times 10 = 90$ J

28. (1)

$\cot^2\theta = \cot^2\theta_1 + \cot^2\theta_2$

29. (4)

Force between BC and AB will be same in magnitude.



$F_{BC} = F_{BA} = \frac{\mu_0 I^2}{2\pi d}$

$F = \sqrt{2} F_{BC}$

$= \sqrt{2}\frac{\mu_0}{2\pi}\frac{I^2}{d}$

$F = \frac{\mu_0 I^2}{\sqrt{2}\pi d}$

30. (2)

Both the astronauts are in the condition of weightness. Gravitational force between them pulls towards each other.

31. (2)

$\frac{E_{rms}}{B_{rms}} = c$

$B_{rms} = \frac{E_{rms}}{c}$

$= \frac{6}{3 \times 10^8}$

$B_{rms} = 2 \times 10^{-8}$

$B_{rms} = \frac{B_0}{\sqrt{2}}$

$B_0 = \sqrt{2} \times B_{rms}$

$= \sqrt{2} \times 2 \times 10^{-8}$

$= 2.83 \times 10^{-8}$ T

32. (4)

$$B = \frac{p}{\left(\frac{\Delta V}{V}\right)}$$

$$\frac{\Delta V}{V} = \frac{p}{B}$$

$$3\frac{\Delta r}{r} = \frac{p}{B}$$

$$\frac{\Delta r}{r} = \frac{p}{3B}$$

33. (3)

Resolving power $\propto \frac{1}{\lambda}$

$$\frac{R_1}{R_2} = \frac{\lambda_2}{\lambda_1}$$

$$= \frac{6000\ \text{Å}}{4000\ \text{Å}}$$

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

34. (4)

$$w_g + w_a = K_f - K_i$$

$$mgh + w_a = \frac{1}{2}mv^2 - 0$$

$$10^{-3} \times 10 \times 10^3 + w_a = \frac{1}{2}\times 10^{-3} \times (50)^2$$

$w_a = -8.75$ J i.e. work done due to air resistance and work done due to gravity = 10 J

35. (4)

Rate of power loss

$$r \propto R^2T^4$$

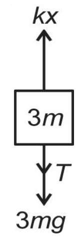
$$\frac{r_1}{r_2} = \frac{R_1^2T_1^4}{R_2^2T_2^4}$$

$$= 4\times\frac{1}{16}$$

$$\frac{450}{r_2} = \frac{1}{4}$$

r_2 = 1800 watt

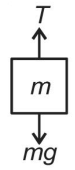
36. (2)



Before the string is cut

$kx = T + 3mg$ ...(1)

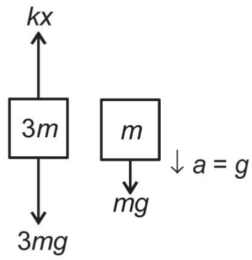
$T = mg$ ...(2)



$\Rightarrow$ $kx = 4mg$

After the string is cut, $T = 0$

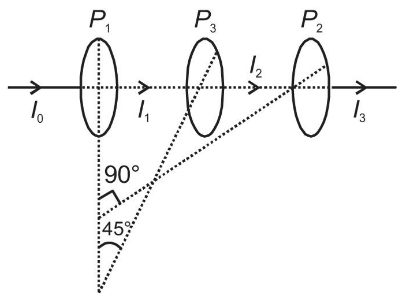
$$a = \frac{kx - 3mg}{3m}$$



$$a = \frac{4mg - 3mg}{3m}$$

$$a = \frac{g}{3}\uparrow$$

37. (3)



$$I_2 = \frac{I_0}{2}\cos^2 45°$$

$$= \frac{I_0}{2}\times\frac{1}{2}$$

$$= \frac{I_0}{4}$$

$$I_3 = \frac{I_0}{4}\cos^2 45°$$

$$I_3 = \frac{I_0}{8}$$

38. (3)

$$\varepsilon = -N\frac{d\phi}{dt}$$

$$\left|\frac{\varepsilon}{R}\right| = \frac{N}{R}\frac{d\phi}{dt}$$

$$dq = \frac{N}{R}d\phi$$

$$\Delta Q = \frac{N(\Delta\phi)}{R}$$

$$\Delta Q = \frac{\Delta\phi_{total}}{R}$$

$$= \frac{(NBA)}{R}$$

$$= \frac{\mu_0 ni\pi r^2}{R}$$

Putting values

$$= \frac{4\pi\times10^{-7}\times100\times4\times\pi\times(0.01)^2}{10\pi^2}$$

$$\Delta Q = 32\ \mu C$$

39. (2)

$$\Delta KE = \frac{1}{2}\frac{I_1I_2}{I_1+I_2}(\omega_1-\omega_2)^2$$

$$= \frac{1}{2}\frac{I^2}{(2I)}(\omega_1-\omega_2)^2$$

$$= \frac{1}{4}I(\omega_1-\omega_2)^2$$

40. (3)

Velocity of girl w.r.t. elevator $= \frac{d}{t_1} = v_{ge}$

Velocity of elevator w.r.t. ground $v_{eG} = \frac{d}{t_2}$ then

velocity of girl w.r.t. ground

$$\vec{v}_{gG} = \vec{v}_{ge} + \vec{v}_{eG}$$

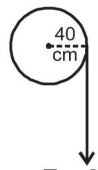
i.e, $v_{gG} = v_{ge} + v_{eG}$

$$\frac{d}{t} = \frac{d}{t_1} + \frac{d}{t_2}$$

$$\frac{1}{t} = \frac{1}{t_1} + \frac{1}{t_2}$$

$$t = \frac{t_1t_2}{(t_1+t_2)}$$

41. (3)



$F = 30$ N

$\tau = I\,\alpha$

$F \times R = MR^2\alpha$

$30 \times 0.4 = 3 \times (0.4)^2\ \alpha$

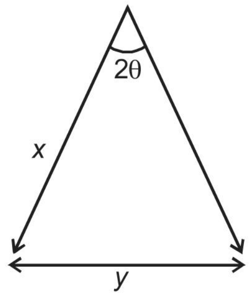
$12 = 3 \times 0.16\ \alpha$

$400 = 16\ \alpha$

$\alpha = 25$ rad/s^2

42. (1)

When mirror is rotated by θ angle reflected ray will be rotated by 2θ.



$$\frac{y}{x} = 2\theta$$

$$\theta = \frac{y}{2x}$$

43. (2)

Two successive frequencies of closed pipe

$$\frac{nv}{4l} = 220 \qquad \text{...(i)}$$

$$\frac{(n+2)v}{4l} = 260 \qquad \text{...(ii)}$$

Dividing (ii) by (i), we get

$$\frac{n+2}{n} = \frac{260}{220} = \frac{13}{11}$$

$11n + 22 = 13n$

$n = 11$

So, $11\frac{v}{4l} = 220$

$$\frac{v}{4l} = 20$$

So fundamental frequency is 20 Hz.

44. (2)

$$(\mu - 1)A + (\mu' - 1)A' = 0$$

$$|(\mu - 1)A| = |(\mu' - 1)A'|$$

$$(1.42 - 1) \times 10^\circ = (1.7 - 1)A'$$

$4.2 = 0.7A'$

$A' = 6^\circ$

45. (3)

$$\frac{R_2}{R_1} = \frac{l_2^2}{l_1^2}$$

$$= \frac{n^2 l_1^2}{l_1^2}$$

$$\frac{R_2}{R_1} = n^2$$

$R_2 = n^2 R_1$

CHEMISTRY

46. (4)
There is no change in bond angles and bond lengths in the conformations of ethane. There is only change in dihedral angle.

47. (3)
IBr_2^-, XeF_2
Total number of valence electrons are equal in both the species and both the species are linear also.

48. (3)
In a solution containing $HgCl_2$, I_2 and I^-, both $HgCl_2$ and I_2 complete for I^-.
Since formation constant of $[HgI_4]^{2-}$ is 1.9×10^{30} which is very large as compared with I_3^- ($K_f = 700$)
$\therefore$ I^- will preferentially combine with $HgCl_2$.

$HgCl_2 + 2I^- \rightarrow HgI_2\downarrow + 2Cl^-$
Red ppt

$HgI_2 + 2I^- \rightarrow [HgI_4]^{2-}$
soluble

49. (2)
Mixture of chloroxylenol and terpineol acts as antiseptic.

50. (4)
Frenkel defect occurs in those ionic compounds in which size of cation and anion is largely different.
Non-stoichiometric ferrous oxide is $Fe_{0.93-0.96}O_{1.00}$ and it is due to metal deficiency defect.

51. (4)

$$Ag_2C_2O_4(s) \rightleftharpoons \underset{2s}{2Ag^+(aq)} + \underset{s}{C_2O_4^{2-}(aq)}$$

$K_{SP} = [Ag^+]^2 [C_2O_4^{2-}]$

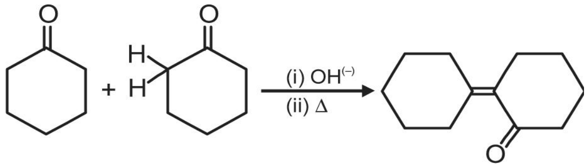
$[Ag^+] = 2.2 \times 10^{-4}$ M

$$\therefore \quad [C_2O_4^{2-}] = \frac{2.2 \times 10^{-4}}{2} M = 1.1 \times 10^{-4} M$$

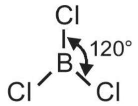
$\therefore$ $K_{SP} = (2.2 \times 10^{-4})^2 (1.1 \times 10^{-4})$

$= 5.324 \times 10^{-12}$

52. (2)



53. (4)

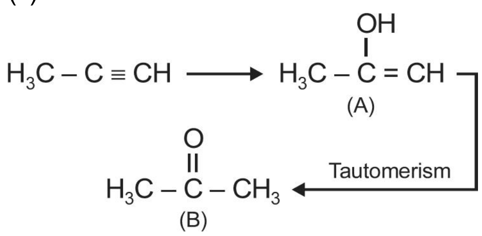


54. (4)
K_f(molal depression constant) is a characteristic of solvent and is independent of molality.

55. (4)
$-NO_2$ group has very strong –I & –R effects.

56. (1)
Inability of ns^2 electrons of the valence shell to participate in bonding on moving down the group in heavier p-block elements is called **inert pair effect.**
As a result,
Pb(II) is more stable than Pb(IV)
Sn(IV) is more stable than Sn(II)
$\therefore$ Pb(IV) is easily reduced to Pb(II)
$\therefore$ Pb(IV) is oxidising agent
Sn(II) is easily oxidised to Sn(IV)
$\therefore$ Sn(II) is reducing agent

57. (4)



58. (2)

A catalyst decreases activation energies of both the forward and backward reaction by same amount, therefore, it speeds up both forward and backward reaction by same rate.

Equilibrium constant is therefore not affected by catalyst at a given temperature.

59. (4)

Energy of 2*s*-orbital and 2*p*-orbital in case of hydrogen like atoms is equal.

60. (3)

$\Delta U = q + w$

For adiabatic process, q = 0

$\therefore \quad \Delta U = w$

$= -P \cdot \Delta V$

$= -2.5 \text{ atm} \times (4.5 - 2.5) \text{ L}$

$= -2.5 \times 2 \text{ L-atm}$

$= -5 \times 101.3 \text{ J}$

$= -506.5 \text{ J}$

$\approx -505 \text{ J}$

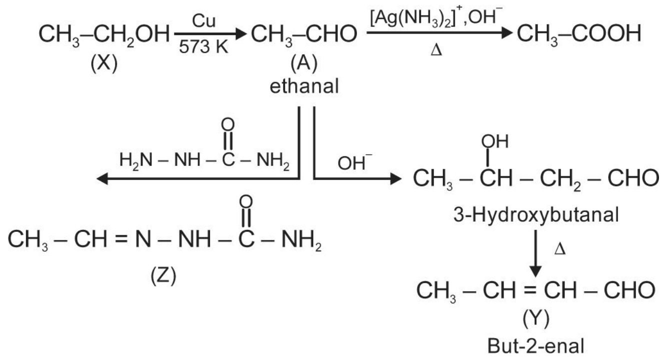
61. (3)

Since 'A' gives positive silver mirror test therefore, it must be an aldehyde or α-Hydroxyketone.

Reaction with semicarbazide indicates that A can be an aldehyde or ketone.

Reaction with OH^- i.e., aldol condensation (by assuming alkali to be dilute) indicates that A is aldehyde as aldol reaction of ketones is reversible and carried out in special apparatus.

These indicates option (3).



62. (2)

Correct order is

$H-C \equiv C-H > H_3C-C \equiv C-H > H_2C = CH_2 > CH_3 - CH_3$

(Two acidic hydrogens) (One acidic hydrogen)

63. (3)

$Zn|ZnSO_4(0.01\text{ M})||CuSO_4(1.0\text{ M})|Cu$

$$\therefore \quad E_1 = E^o_{cell} - \frac{2.303RT}{2 \times F} \times \log\frac{(0.01)}{1}$$

When concentrations are changed

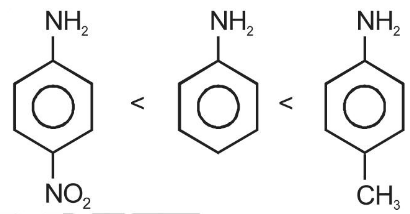
$$\therefore \quad E_2 = E^o_{cell} - \frac{2.303RT}{2F} \times \log\frac{1}{0.01}$$

i.e., $E_1 > E_2$

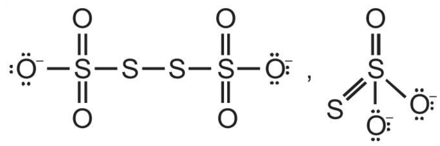
64. (4)

$-NO_2$ has strong –R effect and $-CH_3$ shows +R effect.

$\therefore$ Order of basic strength is



65. (2)



$[S_4O_6]^{2(-)}$ $[S_2O_3]^{2(-)}$

66. (3)

Complexes are respectively $[Co(NH_3)_6]Cl_3$, $[Co(NH_3)_5Cl]Cl_2$ and $[Co(NH_3)_4Cl_2]Cl$

67. (2)

$XX' \rightarrow$ Linear

$XX_3' \rightarrow$ Example : $ClF_3 \rightarrow$ T-shape

$XX_5' \rightarrow$ Example : $BrF_5 \rightarrow$ Square pyramidal

$XX_7' \rightarrow$ Example : $IF_7 \rightarrow$ Pentagonal bipyramidal

68. (3)

It is a fact.

69. (1)

Max. pressure of CO_2 = Pressure of CO_2 at equilibrium

For reaction,

$$SrCO_3(s) \rightleftharpoons SrO(s) + CO_2$$

$K_p = P_{CO_2} = 1.6$ atm = maximum pressure of CO_2

Volume of container at this stage,

$$V = \frac{nRT}{P} \quad \ldots(i)$$

Since container is sealed and reaction was not earlier at equilibrium

$\therefore$ n = constant

$$n = \frac{PV}{RT} = \frac{0.4 \times 20}{RT} \quad \ldots(ii)$$

Put equation (ii) in equation (i)

$$V = \left[\frac{0.4 \times 20}{RT}\right]\frac{RT}{1.6} = 5 \text{ L}$$

70. (4)

Fact.

71. (2)

Micro-organisms present in the soil is a sink for CO.

72. (2)

Z = 114 belong to Group 14, carbon family Electronic configuration = $[Rn]5f^{14}6d^{10}7s^27p^2$

73. (1)

The order of the ligand in the spectrochemical series

$H_2O < NH_3 <$ en

Hence, the wavelength of the light observed will be in the order

$[Co(H_2O)_6]^{3+} < [Co(NH_3)_6]^{3+} < [Co(en)_3]^{3+}$

Thus, wavelength absorbed will be in the opposite order

i.e., $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$

74. (4)

Due to denaturation of proteins, globules unfold and helix get uncoiled and protein loses its biological activity.

75. (2)

Grignard's reagent i.e., RMgX is σ-bonded organometallic compound.

76. (2)

Molarity includes volume of solution which can change with change in temperature.

77. (2)

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

For a reaction to be spontaneous, ΔG = –ve

i.e., $\Delta H < T\Delta S$

$$\therefore \quad T > \frac{\Delta H}{\Delta S} = \frac{35.5 \times 10^3 \text{ J}}{83.6 \text{ JK}^{-1}}$$

i.e., T > 425 K

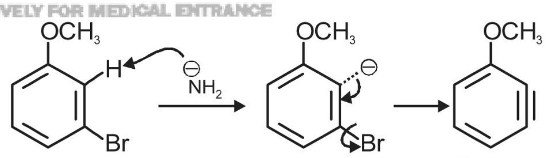
78. (4)

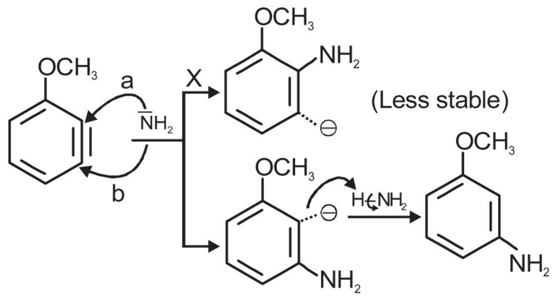
Steam distillation is the most suitable method of separation of 1 : 1 mixture of ortho and para nitrophenols as there is intramolecular H-bonds in ortho nitrophenol.

79. (3)

$CN^{(-)}$ and CO have bond order 3 each.

80. (1)





More stable as –ve charge is close to electron withdrawing group

$\because$ Incoming nucleophile ends on same 'C' on which 'Br' (Leaving group) was present

$\therefore$ **NOT** cine substitution.

81. (2)

$$t_{1/2} = \frac{0.693}{10^{-2}} \text{ second}$$

For the reduction of 20 g of reactant to 5 g, two $t_{1/2}$ is required.

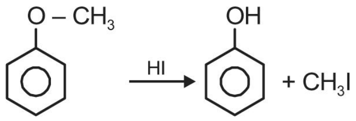
$$\therefore \quad t = 2 \times \frac{0.693}{10^{-2}} \text{ second}$$

= 138.6 second

82. (2)

SO_2 is readily decolourises acidified $KMnO_4$.

83. (3)



84. (3)

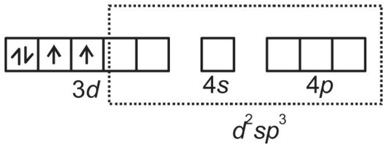
$[Mn(CN)_6]^{3-}$

Mn(III) = [Ar]$3d^4$

CN^- being strong field ligand forces pairing of electrons

This gives $t_{2g}^4 e_g^0$

∴ Mn(III) = [Ar]

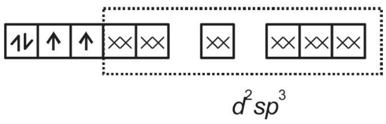


∵ Coordination number of Mn = 6

∴ Structure = octahedral

$[Mn(CN)_6]^{3-}$ =

[Ar]



85. (4)

Li^+ being smallest, has maximum charge density

∴ Li^+ is most heavily hydrated among all alkali metal ions. Effective size of Li^+ in aq solution is therefore,largest.

∴ Moves slowest under electric field.

86. (2)

(I) $N_2 + 3H_2 \rightleftharpoons 2NH_3; K_1 = \frac{[NH_3]^2}{[N_2][H_2]^3}$

(II) $N_2 + O_2 \rightleftharpoons 2NO; K_2 = \frac{[NO]^2}{[N_2][O_2]}$

(III) $H_2 + \frac{1}{2}O_2 \longrightarrow H_2O; K_3 = \frac{[H_2O]}{[H_2][O_2]^{1/2}}$

(II + 3 × III – II) will give

$2NH_3 + \frac{5}{2}O_2 \xrightleftharpoons{K} 2NO + 3H_2O;$

∴ $K = K_2 \times K_3^3 / K_1$

87. (2)

$$CH_3-\overset{O}{\overset{\|}{C}}-NH_2 + Br_2 + 4NaOH \xrightarrow{\Delta} CH_3-NH_2 + 2NaBr + Na_2CO_3 + 3H_2O$$

This is Hoffmann Bromamide reaction.

88. (4)

The solution of this question is given by assuming step (i) to be reversible which is not given in question Overall rate = Rate of slowest step (ii)

= k[X] $[Y_2]$ ...(1)

k = rate constant of step (ii)

Assuming step (i) to be reversible, its equilibrium constant,

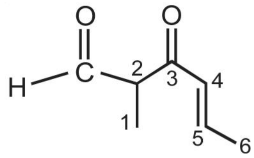
$$k_{eq} = \frac{[X]^2}{[X_2]} \Rightarrow [X] = k_{eq}^{\frac{1}{2}}[X_2]^{\frac{1}{2}} \quad ...(2)$$

Put (2) in (1)

$$\text{Rate} = kk_{eq}^{\frac{1}{2}}[X_2]^{\frac{1}{2}}[Y_2]$$

$$\text{Overall order} = \frac{1}{2} + 1 = \frac{3}{2}$$

89. (1)



Aldehydes get higher priority over ketone and alkene in numbering of principal C-chain.

∴ 3-keto-2-methylhex-4-enal

90. (4)

Zn being more reactive than Ag and Au, displaces them.

From Native ore,

$$4Ag + 8NaCN + 2H_2O + O_2 \xrightarrow{\text{Leaching}} \underset{\substack{\text{Soluble} \\ \text{Sodium dicyanoargentate(I)}}}{4Na[Ag(CN)_2]} + 4NaOH$$

$$2Na[Ag(CN)_2] + Zn \xrightarrow{\text{Displacement}} Na_2[Zn(CN)_4] + 2Ag\downarrow$$