ANSWERS KEY

NEET-2016 (Phase-I) Code-C, R, Y

Date : 01.05.2016

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

NEET-2016 (Phase- I)Solution (Code-C, R, Y)

PHYSICS

91. (1)

To complete the vertical loop, the minimum speed required at the lowest point = $\sqrt{5}$ gR

So ans is (1)

92. (3)

$|\vec{A}+\vec{B}| = |\vec{A}-\vec{B}|$

$(A)^2 + (B)^2 + 2(A)(B)\cos\theta = (A)^2 + (B)^2 - 2(A)(B)\cos\theta$

$2\cos\theta = 0 \Rightarrow \theta = 90^{\circ}$

93. (2)

$$-\frac{GM}{r} = 5.4 \times 10^7$$

$$-\frac{GM}{r} = 6$$

dividing both the equations, r = 9000 km.

so height from the surface = 9000 – 6400 = 2600 km

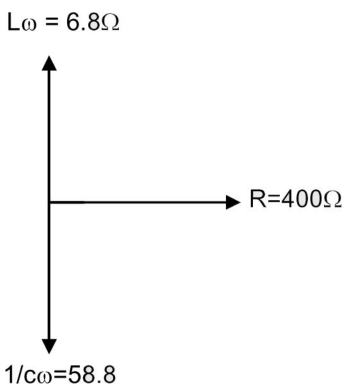
94. (1)

$\phi_{self} = Li$

$(4 \times 10^{-3})(1000) = (L)(4)$

L = 1 Henry

95. (2)



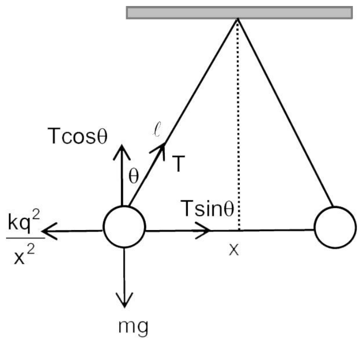
So $|z| = \sqrt{(40)^2 + (58.8 - 6.8)^2} = 65$

$i_0 = \frac{v_0}{|z|} = \frac{10}{65}A \Rightarrow i_{rms} = \frac{i_0}{\sqrt{2}} = \frac{10}{65\sqrt{2}}$

$P_{loss} = i_{rms}^2 R = \left(\frac{10}{65\sqrt{2}}\right)^2 \times 40 = 0.46 \text{watt}$

So the nearest answer will be (2)

96. (4)



$T\sin\theta = \frac{kq^2}{x^2}$

$T\cos\theta = mg$

Dividing the equations

$\tan\theta = \frac{kq^2}{mgx^2}$ here $\tan\theta \approx \sin\theta = \frac{x}{2\ell}$

$\Rightarrow \frac{x}{2\ell} = \frac{kq^2}{x^2}$

$\Rightarrow q \propto x^{3/2}$

$\Rightarrow \frac{dq}{dt} \propto \frac{3}{2}x^{1/2}\left(\frac{dx}{dt}\right) \Rightarrow \frac{dx}{dt} \propto x^{-1/2}$

97. (1)

Initial energy stored in the 2μF capacitor is

$= \frac{1}{2}(2\mu)V^2 = V^2\mu J$

Energy less $= \frac{C_1C_2}{2(C_1+C_2)}(V_1 - V_2) = \frac{(2\mu)(8\mu)}{2(2\mu+8\mu)}(V-0)^2$

$E_{loss} = \frac{5}{4}V^2\mu J$

$\%loss = \frac{5/4V^2}{V^2} \times 100 = 80\%$

98. (4)

$\vec{V} = \cos\omega t\,\hat{i} + \sin\omega t\,\hat{j}$

$\vec{V} = \frac{d\vec{r}}{dt} = -\omega\sin\omega t\,\hat{i} + \omega\cos\omega t\,\hat{j}$

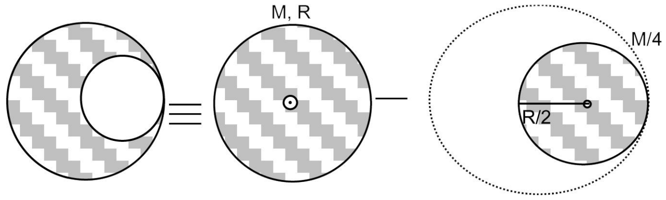
$\vec{a} = \frac{d\vec{V}}{dt} = -\omega^2\cos\omega t\,\hat{i} - \omega^2\sin\omega t\,\hat{j}$

since $\vec{r}.\vec{V} = 0$ so $\vec{r} \perp_r \vec{V}$

and $\vec{a} = -\omega^2\vec{r}$

so $\vec{a}$ will be always aiming towards the origin.

99. (3)



$$I_1 = \frac{MR^2}{2}$$

$$I_2 = \frac{\left(\frac{M}{4}\right)\left(\frac{R}{2}\right)^2}{2} + \left(\frac{M}{4}\right)\left(\frac{R}{2}\right)^2 = \frac{3MR^2}{32}$$

$$I_{net} = I_1 - I_2 = \frac{MR^2}{2} - \frac{3MR^2}{32} = \frac{13MR^2}{32}$$ so answer is 3

100. (3)

$$V_e = \sqrt{\frac{2GM}{R}} = \sqrt{\frac{2G \times \rho \times \frac{4}{3}\pi R^3}{R}}$$

$\Rightarrow V_e \propto R\sqrt{\rho}$

$$\frac{V_1}{V_2} = \frac{R_1\sqrt{\rho_1}}{R_2\sqrt{\rho_2}} \Rightarrow \frac{V_1}{V_2} = \frac{1}{2\sqrt{2}}$$

so answer is 3.

101. (1)

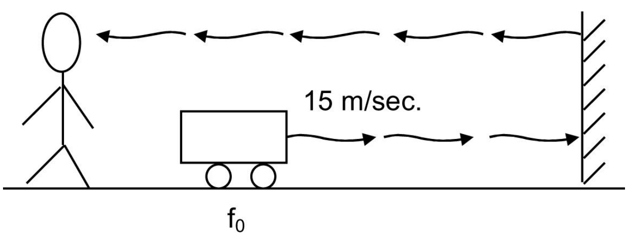
$E_1 + E_2 = K(50)$

$E_1 - E_2 = K(10)$

$$\frac{E_1 + E_2}{E_1 - E_2} = \frac{5}{1}$$

$$\Rightarrow \frac{E_1}{E_2} = \frac{3}{2}$$

102.(4)



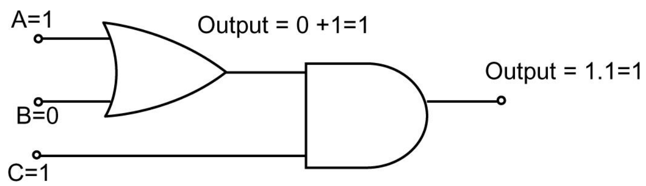
Frequency at the wall will be

$$f' = f_o\left(\frac{v - v_0}{v - v_s}\right) = 800\left(\frac{330 - 0}{330 - 15}\right)$$

$$f' = 800\left(\frac{330}{315}\right) = 838 \text{ Hz}$$

Since the observer and the wall are stationary so frequency of echo observed by the observer will also be 838 Hz.

103. (1)



So answer will be (1)

104. (1)

Path difference between the extreme rays at first minima = a sin θ = λ

a sin (30º) = $\lambda \Rightarrow$ a = 2λ

Path difference between the extreme rays at first secondary maxima = a sin θ' = $\frac{3\lambda}{2}$

(2λ) sin θ' = $\frac{3\lambda}{2}$ $\Rightarrow$ $\theta' = \sin^{-1}\left(\frac{3}{4}\right)$

105. (1)

$$KE_{max.} = eV_{st} = \frac{hc}{\lambda} - \psi$$

$$eV = \frac{hc}{\lambda} - \psi \quad .....(i)$$

$$e\left(\frac{V}{4}\right) = \frac{hc}{2\lambda} - \psi \quad .....(ii)$$

solving equation (i) and (ii)

$$\psi = \frac{hc}{3\lambda} = \frac{hc}{\lambda_{th}} \Rightarrow \lambda_{th} = 3\lambda$$

106. (2)

At closest approach

KE gets converted to PE

$$\frac{1}{2}mV^2 = \frac{k(2e)(ze)}{r} \Rightarrow m\alpha\frac{1}{r} \text{ or } r\alpha\frac{1}{m}$$

107. (2)

(A) m = –2, so image is magnified and inverted. which is possible only for concave mirror. since image is i inverted so it will be real.

(B) M = $-\frac{1}{2}$, so image is inverted and diminished. since image is inverted, so it will be real, and the mirror will be concave.

(C) M = +2, image is magnified so the mirror will be concave. Image is erect so it will be virtual.

(D) m = $+\frac{1}{2}$, image is erect so image will be virtual. Image is virtual and diminished, so the mirror should be convex.

Ans. will be (2)

108. (2)

$W_{all} = KE\uparrow$

$(ma_t)(s) = \frac{1}{2}mv^2$

$(10 \times 10^{-3})(a_t)(4\pi \times 6.4 \times 10^{-2}) = 8 \times 10^{-4}$

$\Rightarrow a_t = 0.1\ m/s^2$

Ans. will be (2)

109. (3)

Capacitor does not consume energy effectively over full cycles

110. (3)

Time does not depend on mass, else

$t \propto \sqrt{\left(1+\frac{k^2}{R^2}\right)}$

$\frac{k^2}{R^2}$ is least for sphere and hence least time is taken by sphere

111. (1)

$\ell_2' = \ell_2(1 + \alpha_2(\Delta\theta))$

$\ell_1' = \ell_1(1 + \alpha_2(\Delta\theta))$

$\ell_2' - \ell_1' = (\ell_1 - \ell_2) + (\alpha_2\ell_2 - \alpha_1\ell_1)\Delta\theta$

As the length difference is independent of temperature difference hence

$\alpha_1\ell_2 - \alpha_1\ell_1 = 0$

$\Rightarrow \alpha_2\ell_2 - \alpha_1\ell_1$

112. (1)

Tube length = $v_0 + f_e$

for objective $\frac{1}{V_0} - \frac{1}{u_0} = \frac{1}{f}$

put $u_0 = -200$ and f = 40 cm we get $v_0 = 50$ cm

$\Rightarrow$ L = 54 cm

113. (2)

The angular speed of disc increases with time, and hence centripetal acceleration

also $a_{net} = \sqrt{a_t^2 + a_c^2}$

$a_c = \frac{\upsilon^2}{R}$

υ = tangential speed

R = Radius = 0.5 m

V = 2 m/s at t = 2

$\Rightarrow a_c = 8$ m/s; $a_t = R\alpha = (0.5)(2)$

$\Rightarrow a_{net} = \sqrt{8^2 + 1^2} \simeq 8$

114. (4)

C.O.P = $\frac{\text{Heat extracted}}{\text{effort put}} = \frac{T_2}{T_1 - T_2}$;($T_2 < T_1$)

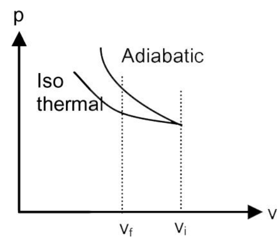
for 1 second analysis

$\Rightarrow \frac{(600)(4.2)}{\text{effort put}} = \frac{277}{26}$

$\Rightarrow$ Effort put = 236.5 J $\Rightarrow$ Power = 236.5 watt

115. (3)

Directly from graph the magnitude of work done = Area under p-v plot is larger for adiabatic compression



116. (1)

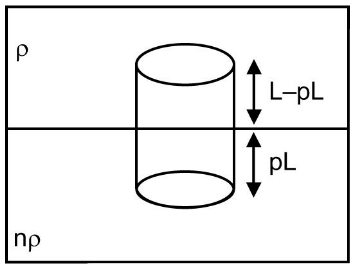
$I = I_{max}\cos^2\left(\frac{\pi y}{\beta}\right) \Rightarrow \beta = \frac{D\lambda}{d} = 10\lambda$

y for a position in front of a slit

$\frac{\beta}{2} = \left(\frac{5\lambda}{2}\right) = 2.5\lambda \Rightarrow I = I_0\cos^2\left(\frac{\pi(2.5\lambda)}{10\lambda}\right)$

$= I_0\cos^2\left(\frac{\pi}{4}\right) = \frac{I_0}{2}$

117. (1)



wt of body = upthrust by the two liquids

If A = Area of section then

(d A.L.) g = [ρA(L – pL) + nρ ApL] g

on solving

$\Rightarrow d = (1+(n-1)p)\rho$

118. (3)

For diode as ideal

$i = \frac{\Delta V}{R} = \frac{4-(-6)}{10^3} = 10^{-2}$ A

119. (3)

For maximum speed the tendency of body is to slip up the incline

hence $\frac{V_{max}^2}{Rg} = \frac{\tan\theta + \mu}{1 - \mu\tan\theta}$

or $V_{max} = \sqrt{Rg\left(\frac{\tan\theta + \mu}{1 - \mu\tan\theta}\right)}$

120. (4)

If r = radial separation

$B = B_{inside} = \left(\frac{\mu_0 i}{2\pi R^2}\right) r = \frac{\mu_0 i}{(2\pi R^2)}\left(\frac{R}{2}\right) = \frac{\mu_0 i}{2\pi R}\left(\frac{1}{2}\right)$

$B' = B_{outside} = \frac{\mu_0 i}{2\pi r} = \frac{\mu_0 i}{2\pi R}\left(\frac{1}{2}\right) \Rightarrow B : B' = 1 : 1$

121. (4)

$\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{\infty^2}\right) \Rightarrow$ wave number $= \frac{10^7 m^{-1}}{4}$

122. (4)

Distance

$$s = \int_1^2 v\,dt = \int_1^2 At + Bt^2$$

$$= \frac{3A}{2} + \frac{7B}{3}$$

123. (3)

Give A = 60 and i = e = 60

$\delta_{min} = i + e - A = 45 + 45 - 60 = 30$

$$\mu = \frac{\sin\left(\frac{\delta_m + A}{2}\right)}{\sin\left(\frac{A}{2}\right)} = \sqrt{2}$$

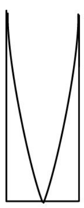
124. (3)

$V_{RMS} = \sqrt{\frac{3RT}{Mo}}$

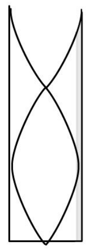
$\frac{V_1}{V_2} = \sqrt{\frac{T_1}{T_2}}$

$\frac{200}{V_2} = \sqrt{\frac{300}{400}} \Rightarrow V_2 = \frac{400}{\sqrt{3}}$

125. (4)



First harmonic at $\frac{\lambda}{4}$



3rd harmonic $\frac{3\lambda}{4}$

1st length = 50 cm

3rd harmonic length 150 cm

126. (2)

$\mu_r = 1 + x$

appropriate is diamagnetic

127. (2)

$\lambda_{electron} = \frac{h}{\sqrt{2ME}}$ ...(1)

For λ_{photon}

$E = h\nu = \frac{hc}{\lambda_{photon}}$ ...(2)

from these two ratio obtained by dividing these (2)

$\lambda_1 : \lambda_2 = \frac{1}{c}\left[\frac{E}{2M}\right]^{1/2}$

128. (1)

M = 1 kg

$a = \frac{F}{M} = \frac{2t}{(1)}\hat{i} + \frac{3t^2}{1}\hat{j}$

$V = \int a\,dt = \int 2t\,dt\ 1 + \int 3t^2 dt$

$V = t^2\ \hat{i} + t^3\hat{j}$

Power = F.V. = $(2ti + 3t^2\hat{j}).(t^2 i + t^3\hat{j})$

power = $2t^3 + 3t^5$

129. (2)

$Q = at - bt^2$

$i = \frac{dQ}{dt} = a - 2bt$ $\qquad$ $i = 0\ t = \frac{a}{2b}$

$H = \int_0^t i^2 R\,dt = \frac{a^3 R}{6b} \Rightarrow \int_0^t I^2 R\,dt$

$$it = \int_0^{a/2b} (a - 2bt)^2 R\,dt = a^2 t + \frac{4b^2 t^3}{3} - \frac{4bat^2}{2}$$

put $t = \frac{a}{2b} \Rightarrow H = \frac{a^3 R}{6b}$

130. (2)

Voltage gain = [current gain] [resistance gain]

$[.96]\,\frac{800}{192}$

power gain = [current gain] [resistance gain]

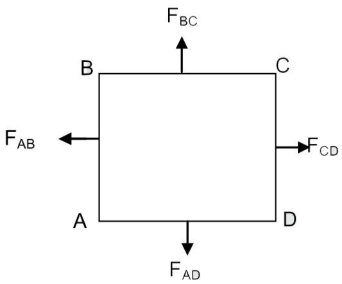
[.96] [4] = 3.84

131. (4)

$\frac{Mgh}{4} = mL$

$h = \frac{4L}{g} = 136\ km$

132. (2)



F_{BC} cancels F_{AD}

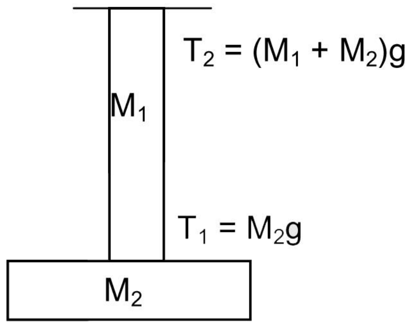
$$F_{Net} = F_{AB} - F_{CD} = \frac{\mu_0 IiL}{2\pi\left(\frac{L}{2}\right)} - \frac{\mu_0 IiL}{2\pi\left(\frac{3L}{2}\right)} = \frac{2\mu_0 Ji}{3\pi} = \frac{2\mu_0 Ii}{3\pi}$$

133. (3)

$\lambda \propto v \propto \sqrt{\frac{T}{m/\ell}}$

$\lambda_1 \propto \sqrt{M_2}$ Tension = M_2g

$\lambda_2 \propto \sqrt{M_2 + M_1}$ Tension = M_2g



$\frac{\lambda_2}{\lambda_1} = \sqrt{\frac{M_1 + M_2}{M_2}}$

134. (1)

$\lambda_{min} T = b$

$\lambda \propto \frac{1}{T}$

$u \propto (T)^4 \propto \frac{1}{(\lambda)^4}$

So $u_1 > u_2$

135. (1)

CHEMISTRY

136. (3)

According to Gibbs Helmholtz equation,

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

Adsorption is a spontaneous process

(where $\Delta S < 0$, $\Delta G < 0$ and $\Delta H < 0$)

137. (2)

$2H^+_{(aq.)} + 2e^- \longrightarrow H_2$(reduction reaction)

$E = E^o - \frac{0.059}{2}\log\frac{P_{H_2}}{\left[H^+_{(aq.)}\right]^2}$

$0 = 0 - \frac{0.059}{2}\log\frac{P_{H_2}}{\left[10^{-7}\right]^2}$

(In order to make log1 = 0)

$P_{H_2} = (10^{-7})^2$

$= 10^{-14}$ atm

138. (1)

Catalyst can affect only activation energy of the chemical reaction and cannot alter any thermodynamic parameters :

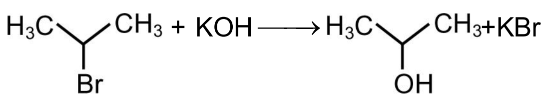
(ie. ΔH, ΔG, ΔS)

139. (3)

(a) $CH_3CH_2CH_2Br + KOH \longrightarrow CH_3CH = CH_2$

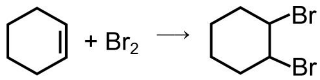
$+ KBr + H_2O \longrightarrow$ Elimination reaction

Formation of π-bond and conversion of saturated compound into unsaturated compound by the removal of groups or atoms is known as Elimination reaction

(b) 

$\longrightarrow$ Substitution reaction

Replacement of one group by other group known as substitution reaction

(c) 

$\longrightarrow$ Substitution reaction

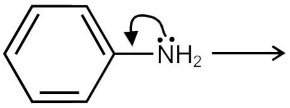
Conversion of unsaturate compound into saturated compound by the addition of groups or atoms is called as addition reaction.

140. (2)

$>C=O + H_2N-R \longrightarrow >C=\ddot{N}-R$

Aldehyde/ketone Schiff's Base

141. (2)



$\longrightarrow$ Delocalised lone pair of aryl amine nitrogen atom with Benzene ring in aryl amine

$R\ddot{N}H_2 \longrightarrow$ lone pair of electrons of nitrogen

(Alkyl amine)

atom are not delocalized in alkyl amine.

142. (2)

Equal moles are given so partial pressure is equal (let = x)

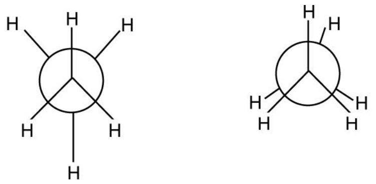
$$\frac{r_{O_2}}{r_{H_2}} = \sqrt{\frac{M_{H_2}}{M_{O_2}}}$$

$$\frac{n_{O_2}/t}{\frac{x}{2}/t} = \sqrt{\frac{2}{32}} = \frac{1}{4}$$

$$\frac{n_{O_2}/t}{\frac{x}{2}/t} = \frac{1}{4} \Rightarrow \frac{n_{O_2}}{x} = \frac{1}{8}$$

fraction of oxygen escaped = $\frac{1}{8}$.

143. (1)



Staggered Newmann conformation — Eclipsed Newmann conformation

Due to bond pair–bond pair repulsion (Torsional strain) eclipsed conformation is less stable than staggered conformation.

144.(3 & 4)

Incorrect option are 3 & 4

Correct order of increasing I[st] I.E $\rightarrow$ B < C < O < N

correct order of increasing electron gain Enthalpy $\rightarrow$ I < Br < F < Cl (in magnitude)

Values (in KJ/mol) $\rightarrow$ 296, 325, 333, 349.

145. (2)

$$\frac{r_2}{r_1} = \frac{C_2}{C_1} \text{ (for first order reaction)}$$

$$k = \frac{1}{t_2 - t_1} \ell n \frac{C_2}{C_1} = \frac{1}{t_2 - t_1} \ell n \frac{r_2}{r_1}$$

$$k = \frac{1}{20 - 10} \ell n \frac{0.04}{0.03} = \frac{1}{10} \ell n \frac{4}{3}$$

$$t_{1/2} = \frac{\ell n 2}{k} = \frac{\ell n 2}{\ell n 4/3} \times 10$$

$$= \frac{2.3 \times 0.3}{2.3(0.6 - 0.477)} \times 10$$

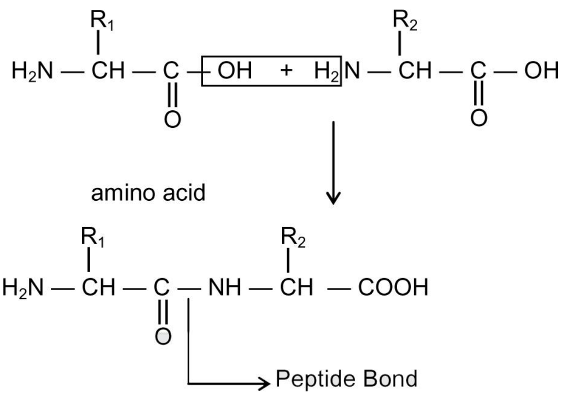
= 24.4 sec.

146. (2)

$$\underset{\text{conc}}{Cu + 4HNO_3} \rightarrow Cu(NO_3)_2 + \underset{\text{Brown gas}}{2NO_2} + 2H_2O$$

$$\left[\begin{array}{l} Cu + \text{conc } HNO_3 \rightarrow NO_2 \\ Cu + \text{dil } HNO_3 \rightarrow NO \end{array}\right.$$

147. (4)



148. (2)

Fog → Dispersed phase is liquid

Fog → Dispersion medium is gas

149. (2)

Cyanide process $\rightarrow$ Leaching process of Au

$$Au + 2NaCN \underset{aq.}{\overset{O_2}{\rightleftharpoons}} Au(CN)_2^- + Na^+$$

Froth floatation process $\rightarrow$ Pressing of ZnS (it is applicable for concentration of sulphide are)

Electrolytic reduction $\rightarrow$ Extraction of Al

Zone refining $\rightarrow$ Purification of Si,Ge

150. (1)

Sucrose is Non Reducing sugar. (both the anomeric carbon are bonded to each other than such sugars are non reducing)

151. (3)

DNA $\downarrow$ De-oxy Ribose sugar

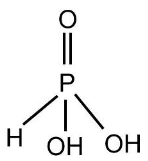
RNA $\downarrow$ Ribose Sugar

152. (4)

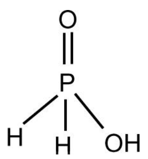
$\Delta G = \Delta H - T\Delta S$

For spontaneous process (ΔG = –Ve) at all temperature, $\Delta H < 0$ & $\Delta S > 0$.

153. (2) Phosphoric acid (Phosphonic acid) H_3PO_3 (dibasic)



Hypophosphorous acid (Phosphinic acid) H_3PO_2 (monobasic)



154. (3)

MY $K_{SP} = S_1^2 = 6.2 \times 10^{-13} = 62 \times 10^{-14}$

$S_1 = 7.9 \times 10^{-7}$ mole/lt = Solubility in pure water

MY_3 $K_{SP} = 27\ S_2^4 = 6.2 \times 10^{-13} = 62 \times 10^{-14}$

$S_2 \simeq 10^{-3.5}$ mole/lt = Solubility in pure water

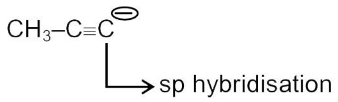
Solubility of NY_3 > solubility of MY so 3rd statement is true.

Addition of KY will decrease the solubility due to common ion effect.

155. (2)

Novalgin is an analgesic it is a fact.

156. (1)



Steric Number (1σ + 1 –ve charge) $\longrightarrow$ **sp**

157. (3)

As oxidation number of central atom increases, acidic nature increases.

$HClO < HClO_2 < HClO_3 < HClO_4$

158. (1)

$K_2Cr_2O_7 \longrightarrow Cr_2(SO_4)_3$ green solution obtain where as SO_2 oxidise into sulphate SO_4^{2-}

$$(K_2Cr_2O_7 + SO_2 + H_2SO_4 \longrightarrow Cr_2(SO_4)_3 + H_2O + K_2SO_4)$$

159. (2)

The order of repulsion force according to VSEPR theory :

lone pair – lone pair > lone pair – bond pair > bond pair – bond pair

160. (1)

Same orbital can have two different values of spin of e^- of +½ and –½ (spin quantum number)

161. (B*)

Reaction of CaC_2 and nitrogen at 1100ºC form nitrolim (calcium cyanamide and carbon mixture).

$CaC_2 + N_2 \longrightarrow CaCN_2 + C$

(No answer in matching)

162. (2)

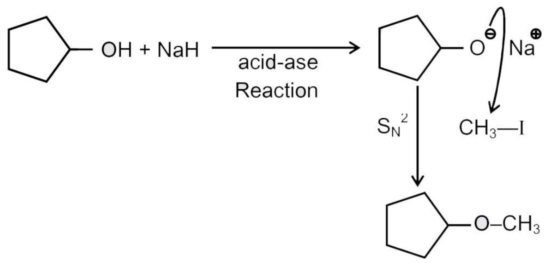
It is fact

163. (3)

Bond dissociation enthalpy

Cl_2	>	Br_2	>	F_2	>	I_2
242.6		192.8		158.8		151.1
						(kJ/mole)

164. (2)



This williamson ether synthesis

165. (3)

$d = \frac{ZA}{N_A - a^3}$ for BCC Z = 2

530 kg/m^3 $= \frac{2 \times 6.94 \times 10^{-3}}{6.02 \times 10^{23} \times a^3}$

$a^3 = 43.50 \times 10^{-30}$

$a = 3.52 \times 10^{-10}$ m

= 352 pm.

166. (2)

$\frac{rA^+}{rB^-} = \frac{0.98 \times 10^{-10}}{1.81 \times 10^{-10}} = 0.54$

Octahedral range $0.414 \le \frac{r+}{r-} < 0.732$

Co-ordination no. of each ion is 6 like NaCl structure.

167. (2)

At B.P. P_0 = 760 torr For elecation of B.P.

$\frac{P^0 - P_s}{P_s} = \frac{W_A / M_A}{W_B / M_B}$ $\Delta T_B = I\,K_b m = 1 \times 0.52 \times \frac{\left(\frac{6.5}{32}\right)}{100} \times 1000 = 1$

$\frac{760 - 732}{732} = \frac{6.5 / M}{100/18}$ =1

On solving M = 32 So B.P. = 100 + ΔT_B = 101ºC

168. (1)

$_{63}$EU $\rightarrow$ [Xe] $4f^7\ 6s^2$

$_{64}$Gd $\rightarrow$ [Xe] $4f^7\ 5d^2 6s^2$

$_{65}$Tb $\rightarrow$ [Xe] $4f^9\ 5d^0 6s^2$

169. (1,2)

1 and 2 option are incorrect

Correct – Dihydrogen act as reducing agent

for eg $3H_2 + N_2 \longrightarrow 2NH_3$

Correct – Hydrogen has three isotopes of which protium ($_1H^1$) is the most common.

170. (2)

$HC{\equiv}CH \xrightarrow[-NH_3\uparrow]{NaNH_2/NH_3} HC{\equiv}C^{\ominus}$—Na+$CH_3$–$CH_2$–Br

$\downarrow S_N2$

$CH_3–CH_2–C{\equiv}C^{\ominus} \xleftarrow{NaNH_2/NH_3(a)} CH_3–CH_2–C{\equiv}CH$

1-Butyne

$\downarrow CH_3CH_2–Br$

$CH_3–CH_2–C{\equiv}C–CH_2–CH_3$ Hex-3-yne

171. (1)

The variation of vapour pressure and temperature is

$\ell_n P = \frac{\Delta H^o}{RT}$ + constant

on differentiate $\frac{d(\ell nP)}{dT} = +\frac{\Delta H^o}{RT^2} + 0$

$\frac{d(\ell nP)}{dT} = \frac{\Delta H^o}{RT^2}$

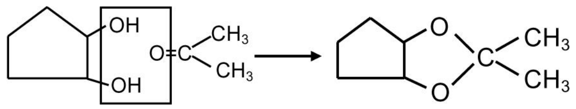
172. (2)

Due to high partial vapour pressure of Benzene as compare to that of toluene so the mole fraction of Benzene will be higher than that of toluene. As a result the vapour will contain a higher percentage of Benzene.

173. (3)

O-substituted biphenyls are optically active as both the rings are not in one plane hence their mirror mages are non-super imposable.

174. (2)



175. (1)

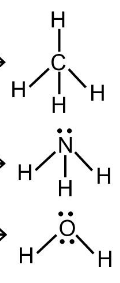
It is known that basic need for the existance of Keto-enol tautomers is the presence of at least one α-hydrogen atom at adjacent sp^3 carbon of carbonyl carbon.

176. (3)

$CH_4 \longrightarrow sp^3 \longrightarrow$ Bond angle = 109º 281

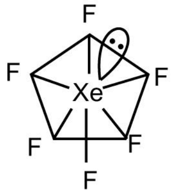
$NH_3 \longrightarrow sp^3 \longrightarrow$ Bond angle = 107º

$H_2O \longrightarrow sp^3 \longrightarrow$ Bond angle = 104º 5

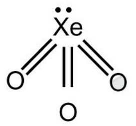


177. (2)

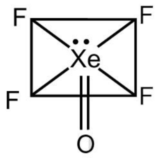
$XeF_6 \longrightarrow sp^3d^3 \longrightarrow$ distorted octahedral



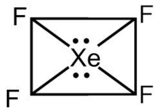
$XeO_3 \longrightarrow sp^3 \longrightarrow$ pyramidal



$XeF_4 \longrightarrow sp^3d^2 \longrightarrow$ square pyramidal



$XeF_4 \longrightarrow sp^3d^2 \longrightarrow$ square planar



178. (3)

If large amount of $KHSO_4$ is added, Concentration of NO_2^+ will decrease and hence the rate of nitration will be slower.

179. (4)

Ca^{+2} are important in blood clotting and are also important in maintaining the regular beating of the heart.

180. (4)

$Fe \rightleftharpoons C \equiv O$

Due to back bonding between metal-carbon bond length of C–O increase (B.O of M–C↑ B.O of C–C↓ B.L. of C–O↑) Higher is negative charge on metal, higher is back bonding (synergic effect) so bond length is higher so answer is $[Fe(CO)_4]^{2-}$

❑ ❑ ❑