ANSWERS KEY

NEET-2016 (Phase-II) Code-BB,QQ,XX

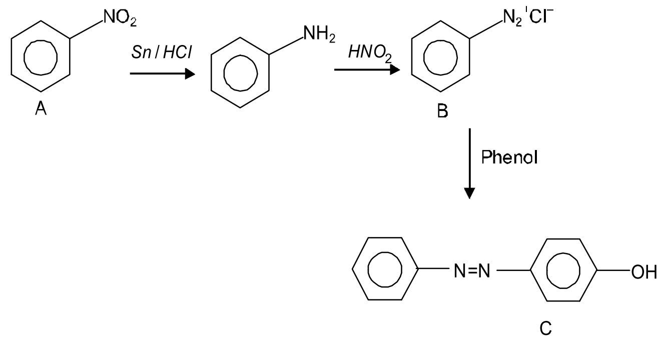
Date : 24.07.2016

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

NEET-2016 (Phase- II)Solution (Code-BB,QQ,XX)

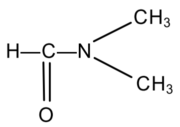
CHEMISTRY

1. (3)



$(C_{12}H_{10}N_2O)$

2. (4)



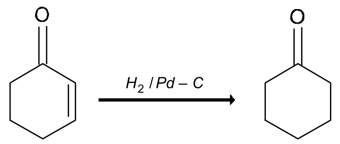
(Polar aprotic solvent)

$CH_3—CH_2—CH_2—Br + NaCN \longrightarrow$

$CH_3—CH_2—CH_2—CN + NaBr$

This is a S_N2 Reaction for which polar aprotic medium is suitable for faster rate of reaction.

3 (3)

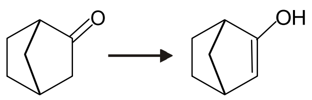


During hydrogenation of α, β unsaturated carbonyl compound by pd catalyst selective reduction is observed of double bond.

4. (2)

only III

α-H at bridge head carbon never show tautomerism.



5. (3)

(II > III > I)

Acidic strength α –I, –M effect

–I effect depand upon distance so II have stronger –I effect than III.

6. (4)

Gaseous Bromine react fastest with alkane by free radical mechanism.

$$\underset{\text{Butane}}{C_4H_{10}} \xrightarrow{Br_2} \underset{(\text{free Radical substitution Reaction})}{C_4H_9Br}$$

7. (4)

Cellulose is example of intramolecular H-bonding

8. (3)

$$\lambda^o_M = \frac{k \times 1000}{M} = \frac{5.76 \times 10^{-3} \times 1000}{0.5}$$

$= 11.52\ S\ cm^2\ mol^{-1}$.

9. (4)

$$PH_3 \xrightarrow{W} P + \frac{3}{2}H_2$$

Rate = k[PH3].

It is independent of the surface coverage because zero order reaction depend on surface area covered by reactant.

10. (3)

$$\text{Coagulation power} \propto \frac{1}{\text{Coagulation value}}$$

Higher the coagulation power, lower is coagulation values in millimoles per litre.

$MgSO_4 > BaCl_2 > NaCl$.

11. (3)

At Cathode : $2H_2O \xrightarrow{2e^-} H_2 + 2OH^-$

At anode : $2Cl \xrightarrow{2e^-} Cl_2 + 2e^-$

$$\frac{w}{E} = \frac{It}{96500}$$

12. (2)

n = 3 ℓ = 1

3p orbital can have only 2 elelctron.

13. (3)

$$\Delta S_{sys} = nR\ \ell n\ \frac{P_1}{P_2} + nCp\ell n\frac{T_2}{T_1}$$

In isothermal process $T_1 = T_2$

$$\Delta S_{sys} = nR\ell n\ \frac{P_i}{P_f}$$

14. (1)

$Ba(OH)_2 \longrightarrow Ba^{+2} + 2OH^-$

$i = 3.$

15. (3)

$C_5H_5N + H_2O = C_5H_5N^+H + OH^-$

0.1

$\alpha = \sqrt{\frac{K_b}{c}} = \sqrt{\frac{1.7\times10^{-9}}{0.1}} = \sqrt{1.7\times10^{-8}} = 1.3\times10^{-4}$

$\% \propto = 1.3 \times 10^{-4} \times 100$

$= 1.3 \times 10^{-2} = 0.013.$

16. (4)

Ca^{2+} is surrounded by $8F^-$

F^- is surrounded by $4Ca^{+2}$

17. (2)

$E^\circ_{cell} < 0$, so it is a non spontaneous process

$\Delta G^\circ = -nFE^\circ = +ve$, so $\Delta G^\circ > 0$

$\Delta G^\circ = -2.303RT \log K$

So, $K < 1$

18. (1)

For ideal solution inter molecular forces are identical so,

$\Delta H^\circ_{mix} = O$, $\Delta V_{mix} = O$ $\Delta G_{mix} < O$

So 1st option is incorrect.

19. (3)

$AgCl \rightleftharpoons Ag^+ + Cl^-$

S S + 0.1

$K_{sp} = [Ag^+][Cl^-]$

$1.6 \times 10^{-10} = S \times (S + 0.1)$

$= S \times 0.1$

$1.6 \times 10^{-9} = S$

20. (2)

For XY_2 $n = \frac{w}{M}$

$0.1 = \frac{10}{X+2Y}$

$X + 2Y = 100$ ....(1)

For X_3Y_2 $n = \frac{w}{M}$

$0.05 = \frac{9}{3X+2Y}$

$3X + 2Y = 180$ ....(2)

Form (1) and (2)

$2X = 80$

$X = 40$ and $2Y = 100 - 40$

$= 60$

$= Y = 30$

21. (4)

$\frac{W}{E} = \frac{1\times60}{96500}$

$= \frac{6}{9650}$ = no. of mole e^-

no. of $e^- = \frac{6}{9650} \times 6.02 \times 10^{23}$

$= 3.75 \times 10^{20}$

22. (4)

$H_3BO_3 + H_2O \rightleftharpoons B(OH)_4^- + H^+$

H_3BO_3 is Lewis acid and accept OH^- from H_2O and releases H^+.

23. (3)

$AlF_3 + KF \xrightarrow{HF} K_3[AlF_6]$

(maximum C.N. of Al^{+3} is six so it form AlF_6^{3-}).

24. (1)

$E^\circ_{Zn^{+2}/zn} = -0.76V$

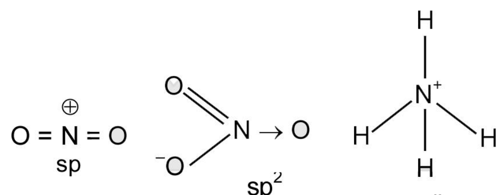
$E^\circ_{Fe^{+2}/Fe} = -0.44V$

Zn has higher negative SRP (Standard reduction potential) so it work as anode and protect iron to make iron as cathode.

25. (4)

Suspension of slaked lime is called milk of lime.

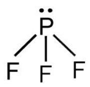
26. (4)



sp sp^2 sp^3

27. (3)

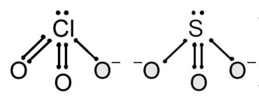
Lewis base → ℓ.p donar

$\ddot{P}F_3$ 

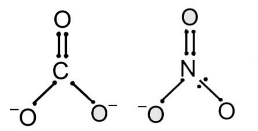
28. (2)

iso electronic → same valence electron.

Iso structural → same structure



Both pyramidal but - valence electron are not same



Both trigonal planar and isoelectronic

29. (2)

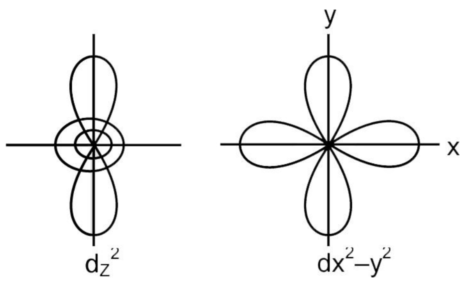
B_2H_6 boron hydride, it is electron deficient and dimer of BH_3.

Al, Cr are having passive nature with HNO_3 but Be dissolve in conc. HNO_3.

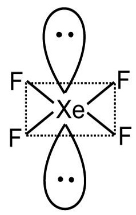
30. (1)

1st reaction is not a redox reaction as the oxidation number of elements remains unchanged.

31. (4)



32. (2)

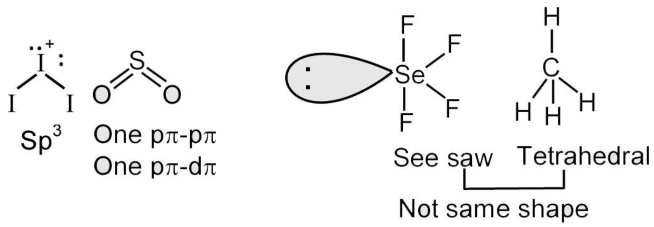


Geometry→ electron pair arrangement

space→ atomic arrangement

Geometry→ octahedral hybridization → sp^3d^2

33. (4)



34. (3)

Trans effect : The intensity of trans effect depend on increase in rate of substitution of the trans ligand.

$F^- < NH_3 < Cl^- < Br^- < Ph^- < CH_3^- < CN^-$

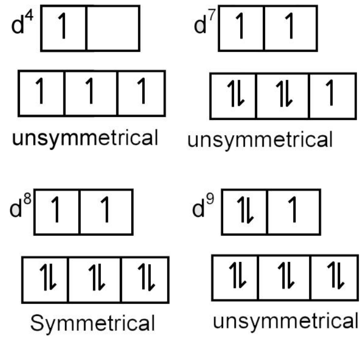
35. (3)

Ce^{+4} is strong oxidising agent and easily convert into Ce^{+3}

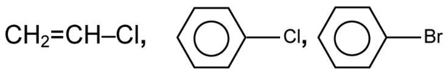
Eu^{+2} exist and behave as reducing agent lanthanons are much more reactive than aluminum. Lanthanoids are basic in nature and their acidity is three.

36. (3)

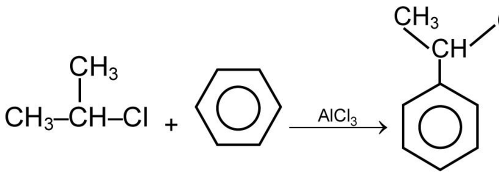
Jahn teller effect : This is geometric distortion occur in unsymmetrical octahedral complexes for example high spin complexes of (high spin)



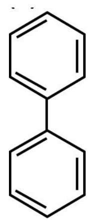
37. (1)



Not suitable for friedal-craft Reaction in Benzene. Isopropyl chlrodie is suitable.



38. (2)



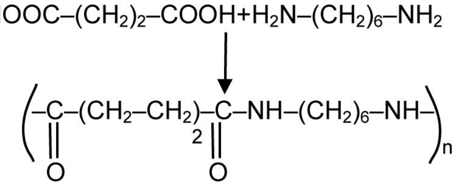
Biphenyl

All carbon atom is sp^2 hybridised and its geometry is trigonal planar

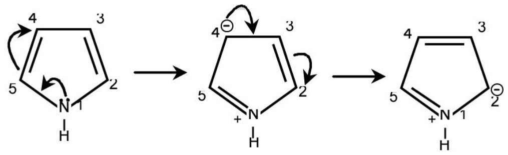
39. (1)

Nylon-66 → adipic acid + Hexamethylenediamine

$HOOC–(CH_2)_2–COOH+H_2N–(CH_2)_6–NH_2$



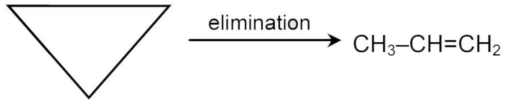
40. (4)



Electron density is maximum on-2,4th carbon.

41. (4)

(i) $CH_3–CH_2–CH_2–Br \xrightarrow{\text{elimination}} CH_3–CH=CH_2$

(ii) 

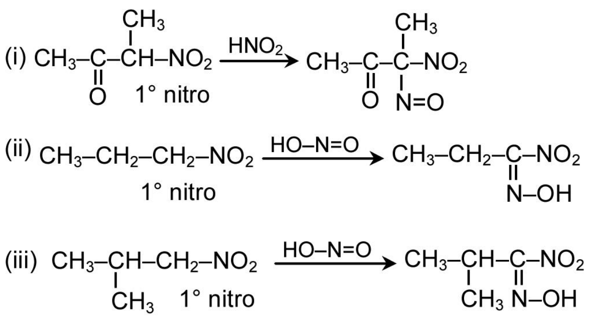
(iii) $CH_3–CH_2–CH_2–OH \xrightarrow{\text{HBr}} CH_3–CH_2–CH_2–Br$

$\xrightarrow{\text{elimination}} CH_3–CH=CH_2$

(iv) $CH_2=C=O \xrightarrow{\text{HBr}}$ No reaction.

42. (4)

1° nitro compound, 2° nitrocompound react with HNO_2 acid but 3° nitro compound does not react with nitrous acid

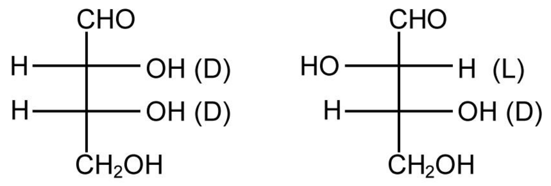


3° nitro $\xrightarrow{HNO_2}$ No reaction

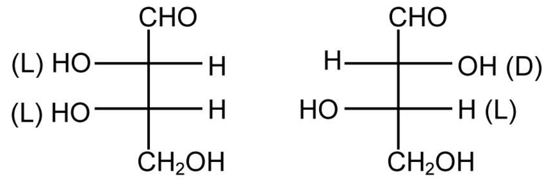
43. (4)

DNA – RNA → Protein

44. (1)

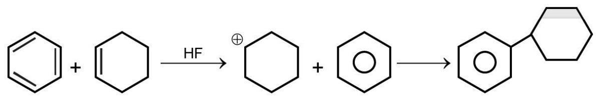


D-erythrose D-threose



L-erythose L-threose

45. (4)



This is a Freidal – Craft reaction.

PHYSICS

136. (3)

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\Rightarrow$ $\frac{1}{-4m} - \frac{1}{\infty} = \frac{1}{f}$

$\Rightarrow$ $f = -4m$ $\Rightarrow$ power $= \frac{1}{f} = \frac{1}{-4} = -0.25D$

137. (1)

Position of Ist minima

$$y = \frac{\lambda D}{a} = \frac{(5 \times 10^{-8})(0.6)}{0.02 \times 10^{-2}}$$

y = 0.15 cm

138. (2)

K.E. of electrons $= \frac{P^2}{2m} = \frac{\left(\frac{h}{\lambda}\right)^2}{2m} = \frac{h^2}{2m\lambda^2}$

So maximum energy of photon will also be this much.

$\frac{hc}{\lambda_0} = \frac{h^2}{2m\lambda^2} \Rightarrow \lambda_0 = \frac{2mc\lambda^2}{h}$

139. (1)

$k_{max} = h\nu - \phi$

$2eV = 5eV - \phi \Rightarrow \phi = 3eV$

So V_{st} = 3 volt

$V_{cathode} - V_{anode}$ = 3 volt

$V_{anode} - V_{cathode}$ = – 3 volt

140. (4)

$$\frac{1}{\lambda} = Re\left(\frac{1}{2^2} - \frac{1}{3^2}\right)$$

$$\frac{1}{\lambda'} = Re\left(\frac{1}{3^2} - \frac{1}{4^2}\right)$$

dividing $\lambda' = \frac{20}{7}\lambda$ **Ans.**

141. (1)

$N_1 = 0.6\ N_0$

$N_2 = 0.15\ N_0$

$\frac{N_2}{N_1} = \left(\frac{1}{2}\right)^2$ so two half life period has passed

so time taken = $2t_{1/2}$ = 2 × 30 = 60 minutes

142. (3)

$A_V = \beta \dfrac{R_{out}}{R_{in}}$

$A_V = 100 \times \dfrac{2k\Omega}{1k\Omega} \quad \Rightarrow \quad A_V = 200$

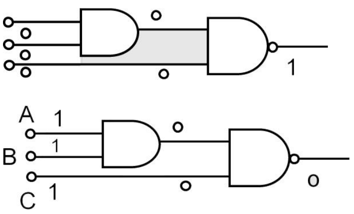
$A_V = \dfrac{(V_{out})_{AC}}{(V_m)_{AC}} = 200 \quad \Rightarrow \quad (V_{in})_{AC} = \dfrac{4}{200} = 200 \text{ mV}$

143. (2)

The diode D_1 will be be in reverse bias, so it will block the current and diode D_1 will be in forward bias, so it will pass the current

$i = \dfrac{10}{2+2} = 2.5 \text{ A}$

144. (4)



145. (2)

$L = (h)^a (c)^b (G)^c$

$m^0L^1T^0 = (m^1L^2T^{-1})^9 (L^1T^{-1})^B (m^{-1}C^3T^{-2})^c$

$a - c = 0, \qquad 2a + b + 3c = 1, \qquad -a - b - 2c = 0$

solving $b = -3/2$, $a = 1/2$, $c = 1/2$

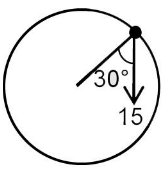
$L = \dfrac{\sqrt{hG}}{c^{3/2}}$ **Ans.**

146. (1)

$V_P = V_Q$

$a + 2bt = f - 2t \quad \Rightarrow t = \dfrac{f-a}{2(b+1)}$ **Ans.**

147. (4)



$a_c = \dfrac{V^2}{r}$

$15\cos 30° = \dfrac{V^2}{2.5}$

$V^2 = 32.73$

V = 5.7 m/sec **Ans.**

148. (2)

J = 2mV cos 60 = mV **Ans.**

149. (4)

During the collision, apply moementum conservation

$(0.01)(400) + 0 = (2)V + (0.01)V'$

where $V = \sqrt{2gh}$

$V = \sqrt{2 \times 10 \times 0.1}$

$V = \sqrt{2}$

solving V' = 120 m/sec. **Ans.**

150. (4)

Mass of balls are same and the collision is perfectly elastic, so their velocity will be interchanged.

So, $V_A = -0.3$ m/s, $V_B = 0.5$ m/s **Ans.**

151. (4)

$\vec{S} = \vec{r}_f - \vec{r}_i = (4\hat{j} + 3\hat{k}) - (-2\hat{i} + 5\hat{j})$

$= 2\hat{i} - \hat{j} + 3\hat{k}$

$\vec{F} = 4\hat{i} + 3\hat{j}$

$\omega = \vec{F}.\vec{S} = (4\hat{i} + 3\hat{j}).(2\hat{i} - \hat{j} + 3\hat{k})$

= 8 – 3 = 5J **Ans.**

152. (4)

$KE_A = KE_B$

$\dfrac{1}{2} I_A \omega_A^2 = \dfrac{1}{2} I_B \omega_B^2 \quad \Rightarrow$ since $I_B > I_A$ so $\omega_B < \omega_A$

$\dfrac{1}{2} L_A \omega_A = \dfrac{1}{2} L_B \omega_B \quad \Rightarrow L_B > L_A$ **Ans.**

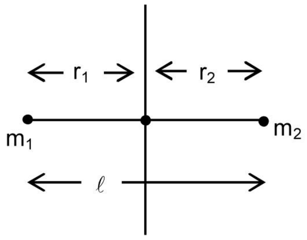
153. (3)

KE of sphere $= \dfrac{1}{2}\left(\dfrac{2}{5} mR^2\right)\omega^2 = \dfrac{1}{5} mR^2\omega^2$

KE of cylinder $= \dfrac{1}{2}\left(\dfrac{mR^2}{2}\right)(2\omega)^2 = mR^2\omega^2$

So, $\dfrac{KE_{sphere}}{KE_{cylinder}} = \dfrac{1}{5}$ **Ans.**

154. (2)



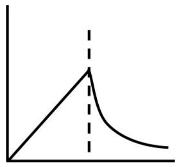
$I = m_1r_1^2 + m_2r_2^2$

$= m_1\left(\frac{m_2}{m_1+m_2}\ell\right)^2 + m_2\left(\frac{m_1}{m_1+m_2}\ell\right)^2$

$= \frac{m_1m_2(m_1+m_2)\ell^2}{(m_1+m_2)^2}$

$= \frac{m_1m_2\ell^2}{(m_1+m_2)}$ **Ans.**

155. (3)



$g_{in} = g_o\frac{r}{R}$ g_o is 'g' at surface

$g_{in} = g_o\left(\frac{R^2}{r^2}\right)$

156. (3)

$TE = -\frac{GMm}{2(R+h)} = -\frac{GMm}{2(R+h)}\frac{R^2}{R^2} = -\frac{g_0mR^2}{2(R+h)}$

157. (3)

Increase in surface area = $(20\ cm^2 - 8\ cm^2) \times 2$

$= 12 \times 2\ cm^2$

$= 24\ cm^2$ (film has two surfaces)

So work done = $T.\Delta S = T \times 24 \times 10^{-4} = 3 \times 10^{-4}$

so $T = \frac{3}{24}N/m = \frac{1}{8}Nm^{-1} = 0.125$ N/m

158. (3)

$h = \frac{2T\cos\theta}{\rho gr}$

$\frac{\cos\theta_1}{\rho_1} = \frac{\cos\theta_2}{\rho_2} = \frac{\cos\theta_3}{\rho_3}$

$\cos\theta_1 > \cos\theta_2 > \cos\theta_3$ as $\rho_1 > \rho_2 > \rho_3$

$0 \le \theta_1 < \theta_2 < \theta_3 < \pi/2$

159. (3)

Body at 100°C temperature has greater heat capacity than body at 0°C so final temperature will be closer to 100°C. So Tc > 50°C

160. (3)

$\Delta T = \Delta T_0 e^{-\lambda t}$

$T = 2Te^{-\lambda(10\ min)}$

$\Delta T' = 2Te^{-\lambda(20\ min)} = 2T\left(\frac{1}{2}\right)^2 = \frac{T}{2}$

So $T_f = T + \frac{T}{2} = \frac{3T}{2}$

161. (1)

PV^3 = constant

for a polytropic process. PV^α = constant

$C = C_v + \frac{R}{1-\alpha} = \frac{3}{2}R + \frac{R}{1-3} = \frac{3R}{2} - \frac{R}{2} = R$

162. (3)

$\frac{Q_{more}}{W} = \frac{Q_{more}}{Q_{more} - Q_{less}} = \frac{T_{more}}{T_{more} - T_{less}}$

$= \frac{t_1+273}{(t_1+273)-(t_2+273)} = \frac{t_1+273}{t_1-t_2}$

163. (3)

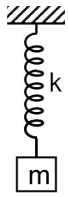
$n = \frac{PV}{RT} = \frac{mass}{Molar\,mass} = \frac{PV}{RT}$

density $= \frac{mass}{volume} = \frac{(Molar\,mass)P}{RT} = \frac{(m.N_A)P}{RT} = \frac{mP}{KT}$

164. (1)

$T = 2\pi\sqrt{\frac{m}{k}} = 3\,sec$

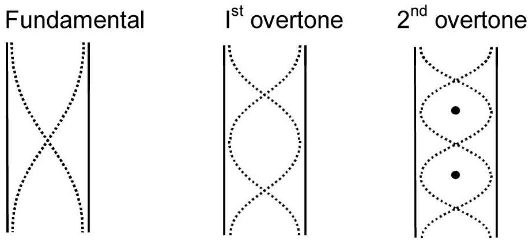
$T' = 2\pi\sqrt{\frac{m+1}{k}} = 5\,sec$



dividing & squaring $\left(\frac{m}{m+1}\right) = \left(\frac{3}{5}\right)^2 = \frac{9}{25}$

$25m = 9m + 9$ so $m = \frac{9}{16}$ kg

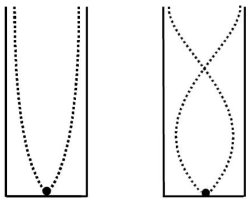
165. (3)



$\frac{3\lambda}{2} = \ell_0$

$\lambda = \frac{3\ell_0}{3}$

f = $\frac{3V}{2\ell_0}$



$\frac{3\lambda}{4} = L_c$

$\lambda = \frac{4L_e}{3}$

f = $\frac{3V}{4L_e} = \frac{3V}{4L} = \frac{3V}{2\ell_0}$

$\ell_0 = 2L$

166. (2)

no. of beats = 1

(HCF of beat frequencies)

167. (3)

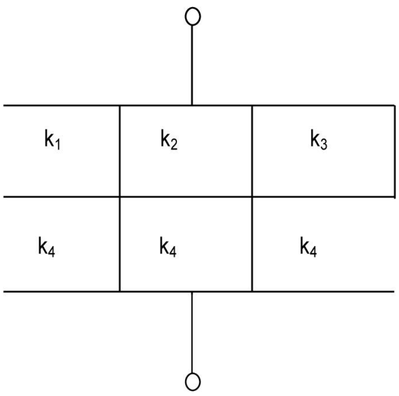
$\tau = PE \sin\theta$

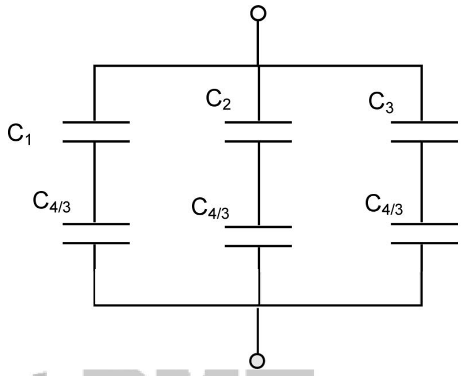
$4 = P \times 2 \times 10^5 \times \frac{1}{2}$

$\Rightarrow$ $P = 4 \times 10^{-5}$ cm $= q \times 2 \times 10^{-2}$

So $q = \frac{4\times10^{-5}}{2\times10^{-2}} = 2\times10^{-3}$ coulomb

168. (4*)





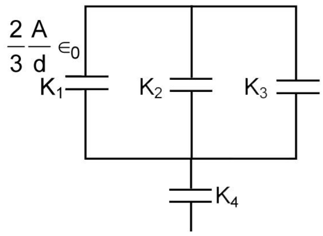
$$\frac{1}{C_1} + \frac{3}{C_4} = \frac{3d}{2k_1\varepsilon_0 A} + \frac{3d}{2k_4\varepsilon_0 A} = \frac{3d}{2\varepsilon_0 A}\left\{\frac{1}{k_1} + \frac{1}{k_4}\right\}$$

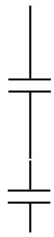
$$C_{eq} = \frac{K\varepsilon_0 A}{d} = \frac{2\varepsilon_0 A}{3d}\left\{\frac{k_1k_4}{k_2+k_4} + \frac{k_2k_4}{k_2+k_4} + \frac{k_3k_4}{k_3+k_4}\right\}$$

$$k = \frac{2}{3}\left\{\frac{k_1k_4}{k_1+k_4} + \frac{k_2k_4}{k_2+k_4} + \frac{k_3k_4}{k_3+k_4}\right\}$$

Alter :

Wrong solution seems to be correct as per the options given.





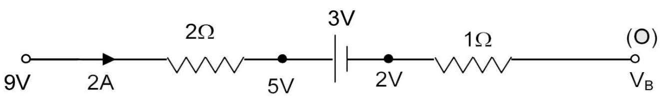
$= \frac{2A}{3}\frac{\epsilon_0}{d}(k_1 + k_2 + k_3) = C_A$ $\quad = \frac{A\,\epsilon_0}{d} k_4 = C_B$

$$\frac{1}{C_{eq.}} = \frac{1}{C_A} + \frac{1}{C_B}$$

$$\frac{d}{a\varepsilon_0 K_{eq}} = \frac{3d}{2A\varepsilon_0}(k_1 + k_2 + k_3) \quad \frac{d}{2A\varepsilon_0 k_4}$$

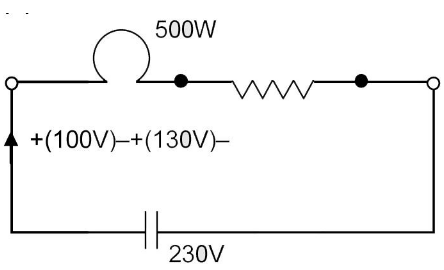
$$\frac{1}{k_{eq}} = \frac{3}{2}(k_1 + k_2 + k_3) + \frac{1}{2k_4}$$

169. (1)



$V_A - V_B = 9$volt

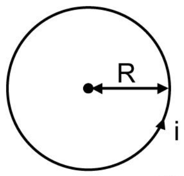
170. (4)



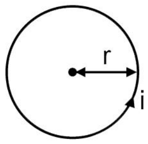
$i = \frac{500}{100} = 5A$ so $130 = 5R$

$R = 26\ \Omega$

171. (3)



$B = \frac{\mu_0 i}{2R} = \frac{\mu_0 i(2\pi)}{2(\ell)} = \frac{\mu_0 \pi i}{2\ell}$



$B' = \frac{\mu_0 ni}{2r} = \frac{\mu_0 ni}{2\left(\frac{\ell}{2n\pi}\right)} = \frac{n^2\mu_0 \pi i}{2\ell} = n^2 B$

172. (3)

$W_{ext} = U_f - V_i$

$= -MB\cos 60° - (-MB)$

$= MB(1 - \cos 60°) = MB/2 = W$

$r = MB\sin 60° = MB\ \frac{\sqrt{3}}{2} = \sqrt{3}W$

173. (2)

$R = \frac{mV}{qB}$

$\omega = \frac{V}{R} = \frac{qB}{m}$

$f = \frac{\omega}{2\pi} = \frac{1}{2\pi}.\frac{qB}{m} = \frac{1.76\times 10^{11}\times 3.57\times 10^{-2}}{(2\times 3.14)} = 10^9 Hz$

174. (4)

Option with highest quality factor sould be chosen as most appropriate answer.

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

175. (1)

$e = -\frac{d\phi}{dt} = -\frac{d}{dt}\{\pi r^2 B\} = -\pi r^2\frac{dB}{dt}$ in loop 1 & zero in loop 2.

176. (4)

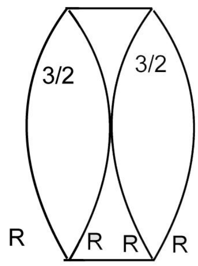
Power factor $= \frac{R}{z} = \frac{iR}{iz} = \frac{80}{\sqrt{(80)^2+(60)^2}} = \frac{80}{100} = 0.8$

177. (2)

$z = \sqrt{R^2 + X_c^2} = \sqrt{(100)^2+(100)^2} = 100\sqrt{2}$

$i_{max} = \frac{v_{max}}{z} = \frac{220\sqrt{2}}{100\sqrt{2}} = 2.2$

178. (1)



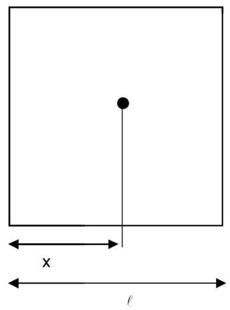
$\frac{1}{f} = \left(\frac{3}{2}-1\right)\frac{2}{R} = \frac{1}{R}$

$\frac{1}{f'} = \left(\frac{4}{3}-1\right)\left\{-\frac{2}{R}\right\} = -\frac{2}{3R}$

So $\frac{1}{f_{eq}} = \frac{1}{f} - \frac{2}{3f} + \frac{1}{f} = \frac{3-2+3}{3f} = \frac{4}{3f}$

$f_{eq} = \frac{3f}{4}$

179. (4)



$\frac{x}{\mu} + \frac{(\ell - x)}{\mu} = 3 + 5$

$\frac{\ell}{\mu} = 8$

$\ell = 8 \times \frac{3}{2} = 12$ cm

180. (3)

$I_{max} = \left(\sqrt{I_1}+\sqrt{I_2}\right)^2 = \left(\sqrt{nI_1}+\sqrt{I}\right)^2 = \left(\sqrt{n}+1\right)^2 I$

$I_{min} = \left(\sqrt{n}-1\right)^2 I$

$\frac{I_{max}-I_{min}}{I_{max}+I_{min}} = \frac{n+1+2\sqrt{n}-n-1+2\sqrt{n}}{(n+1+2\sqrt{n})+(n+1-2\sqrt{n})} = \frac{4\sqrt{n}}{2(n+1)} \Rightarrow \frac{2\sqrt{n}}{(n+1)}$