PACE-IIT & MEDICAL

ANDHERI / BORIVALI / DADAR / CHEMBUR / THANE / NERUL / KHARGHAR / POWAI

MOCK TEST - 12 - (NEET 2018 Aspirants) - Solutions

(1) - $(\vec{a_1} - \vec{a_2}).(2\vec{a_1} + \vec{a_2}) = 2\vec{a_1}\cdot\vec{a_1} + \vec{a_1}\cdot\vec{a_2} - \vec{a_2}\cdot(2\vec{a_1}) - \vec{a_2}\cdot\vec{a_2}$

$= 1 - \vec{a_1}\vec{a_2} = 1 - a_1a_2\cos\theta$

Also $|\vec{a_1} + \vec{a_2}| = \sqrt{a_1^2 + a_2^2 + 2a_1a_2\cos\theta} = 3$

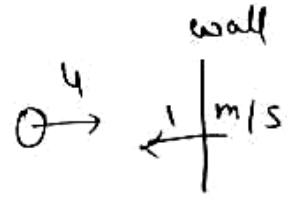
$a_1a_2\cos\theta = 1/2$

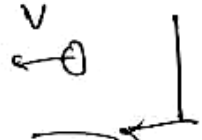
$\Rightarrow (\vec{a_1} - \vec{a_2}).(2\vec{a_1} + \vec{a_2}) = 1 - 1/2 = 1/2$

(2) - 3

(3). $e = 1 \Rightarrow (4+1) = V_* - 1$

$V = 6$ m/s





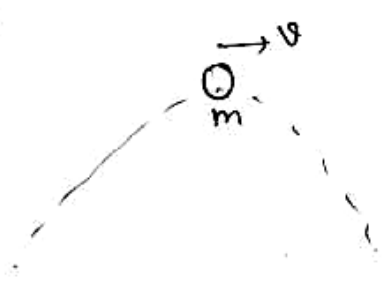
(4) → $H = (u\sin\theta)t - \frac{1}{2}gt^2 \Rightarrow gt^2 - 2u\sin\theta t + 2H = 0$ (1 m/s)

have 2 roots t_1 & t_2. And $t_1 + t_2 = \frac{2u\sin\theta}{g}$

The max^m height is given as : $H_{max} = \frac{u^2\sin^2\theta}{2g}$

$\Rightarrow H_{max} = \frac{(t_1 + t_2)^2}{8}$

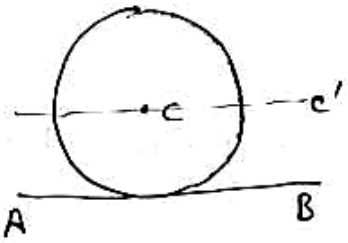
(5)



$E_1 = \frac{1}{2}\left(\frac{m}{2}\right)(2v)^2 = \frac{mv^2}{4}$

$E_2 = \frac{1}{2}\left(\frac{m}{2}\right)(3v)^2 = \frac{9}{4}mv^2$

$E_2 = 9E_1$

(6) 

$I_{AB} = I_{cc'} + mR^2$

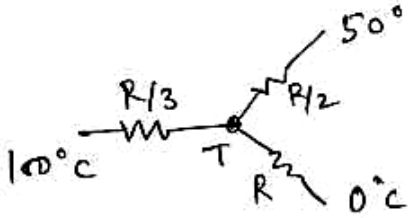
$= \frac{mR^2}{2} + mR^2 = \frac{3MR^2}{2}$

$l = 2\pi R \Rightarrow$ $I_{AB} = \frac{3}{2} \rho l \left(\frac{l}{2\pi}\right)^2$

$m = \rho l$ $= \frac{3\rho l^3}{8\pi^2}$

(7) – 4

(8) → 3

(9) → 

$\Rightarrow T = \frac{\frac{100}{(R/3)} + \frac{50}{(R/2)} + \frac{0}{R}}{\frac{3}{R} + \frac{2}{R} + \frac{1}{R}}$

$= \frac{400}{6} = \frac{2000}{3}°C$

(10) % remain after 5 half lives $= \frac{1}{(2)^5} \times 100 = 3.125\%$

(11) for objective lense : $v = 12$ c.m $f = 2$ c.m

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{12} - \frac{1}{u} = \frac{1}{2} \Rightarrow u = \frac{-12}{5} = -2.4$ c.m

(12) water 

water $\frac{\mu_w}{f} = \frac{\mu_1 - \mu_w}{R} + \frac{(\mu_2 - \mu_1)}{(-R)} + \frac{(\mu_w - \mu_1)}{R}$

$\frac{4}{3(30)} = \frac{(\mu_1 - \mu_2)}{15}$

$\mu_1 - \mu_2 = \frac{2}{3}$

(13) :- $\frac{4}{1.2+2r} = \frac{2}{1.2+r/2} \Rightarrow 4.8+2r = 2.4+4r$

$\Rightarrow 2r = 2.4 \Rightarrow r = 1.2\ \Omega$

(14) $\phi = hf_0$

$h(2f_0) - h(f_0) = \frac{1}{2} m_e (4\times10^6)^2$ ——(i)

$h(5f_0) - hf_0 = \frac{1}{2} m_e (v)^2$ ——(ii)

from (i) & (ii) $\frac{1}{4} = \frac{16\times10^{12}}{v^2} \Rightarrow v = 8\times10^6$ m/s

(15) Voltage Gain $= \frac{(2\times10^3)(10\times10^{-3})}{(200)(10\times10^{-6})} = 10000$

(16) . (3)

(17) . (4)

(18) . $\vec{a} = \frac{-4\hat{i}-8\hat{j}}{4} = -\hat{i}-2\hat{j}$

$\vec{v} = (15\hat{i}+20\hat{j}) + (-\hat{i}-2\hat{j})t$

$= (15-t)\hat{i} + (20-2t)\hat{j}$

When y- component become zero $\Rightarrow 20-2t = 0$

$t = 10$ sec

At that moment x- Component $= 15-10 = 5$ m/s

(19). $\frac{\Delta V}{V} = \frac{\Delta l}{l} + 2\frac{\Delta r}{r}$

$= 2\% + 2(0.5 \times 2) = 0\%$.

(20). mass of water rise $= \rho\pi r^2 h = \rho\pi r^2\left(\frac{2T\cos\theta}{\rho g r}\right)$

(1) $m \propto r \Rightarrow R \to 2R \quad m \to 2M$ ✓

(21) $V_{rms} \propto \sqrt{T} \Rightarrow \frac{v_1}{v_2} = \sqrt{\frac{300}{1200}} \Rightarrow v_2 = 2v_1$

(22) $\frac{\Delta V}{V} = \frac{1}{2}\frac{\Delta T}{T} = 1\%$

$\frac{\Delta f}{f} = \frac{\Delta V}{V} \Rightarrow \frac{5}{f} = 1\% \Rightarrow f = 500\ Hz$

(23) $\phi = \pi R^2 E$

(24) $P_1 = P_2$ & $\lambda = \frac{h}{p} \Rightarrow \frac{\lambda_1}{\lambda_2} = 1$

(25) (3)

(26) $\frac{\Delta T}{T} = \frac{1}{2}\alpha\Delta\theta \Rightarrow \frac{\Delta T}{86400} = \frac{1}{2} \times 12 \times 10^{-6} \times 20 \Rightarrow \Delta T = 10.36\ sec/day$

(27) $t = \frac{d_{out} - d_{in}}{2} = \frac{4.23 - 3.89}{2} = \frac{0.34}{2} = 0.17$

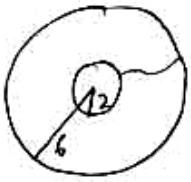
$\frac{\Delta t}{t} = \Delta d_{out} + \Delta d_{in} = 0.02$

$t = (0.17 \pm 0.02)\ cm$

(28) – (1)

(29) $2\lambda \cos\theta = \lambda \Rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = 60^\circ$

$\tan 60^\circ = \frac{x}{D} \Rightarrow x = \sqrt{3}\,D$

(30) 

$Q = (4\pi\varepsilon_0 r)V \Rightarrow Q = K(2)(120)$

$V' = \frac{K(2)(120)}{K6} = 40\ V$

(31) (3) $V_{capacitor} = \frac{E}{(R_2+r)} R_2$

$Q_{cap} = CV$

$= \frac{CER_2}{R_2+r}$

(32) $_{92}U^{238} \longrightarrow {}_{82}P^{214} \Rightarrow$ Chang in Atomic Weigh = 24
" Number = 10

$6\alpha, 2\beta$

(33) $E_p = \frac{hc}{\lambda}$; $E_e = \frac{1}{2}mv^2 = \frac{p^2}{2m} = \frac{(h/\lambda)^2}{2me}$

$E_e : E_p = \frac{(h/\lambda)}{2me} : c \approx 1 : 100$

(34) 2 beats

(35) $R_1 = \frac{(220)^2}{100}$; $R_2 = \frac{(220)^2}{60}$

When $||^{rl}$ $R_{eq} = \frac{(220)^2}{160}$; $i = \frac{220}{R_{eq}} = \frac{160}{220} = 0.73\ A$

(36) $\frac{g}{9} = \frac{GM}{(R+h)^2} \Rightarrow \frac{1}{9}\frac{GM}{R^2} = \frac{GM}{(R+h)^2}$

$R+h = 3R \Rightarrow h = 2R$

(37) 

$t = \frac{2u\sin\theta}{g} = 2\times(98)(\sin 30°) = 10$ sec

after 10 sec the projectile will be on ground

$\Delta p = mv = (0.5)(98) = 49$ N-sec

(38) for 1st droplet $r_1 = r$; $m_1 = m$; $V_T = V$

for 2nd droplet $r_2 = 2r$; $m_2 = 8m$ $V_T = 4V$

$P_1 = mV$ & $P_2 = 32mV = 32P_1$

(39) $\mu = \tan\theta = \tan 30° = \frac{1}{\sqrt{3}} = 0.577$

(40) $\lambda \propto \frac{1}{p} \Rightarrow \frac{\lambda_1}{\lambda_2} = \frac{P_2}{P_1} = \frac{m_2 v_2}{m_1 v_1} = \frac{(E_2)^2/2m_2}{(E_1)^2/2m_1}$

$E_1 = E_\alpha = (100)(2q_e)$; q_e = electron charge

$E_2 = E_d = (100)(q_e)$

$\frac{\lambda_1}{\lambda_2} = \frac{(100\,q_e)^2/2(2m_p)}{(200\,q_e)^2/2(4m_p)} = \frac{1}{4}\times 2 = \frac{1}{2}$

(41) $B = -V\frac{dP}{dV}$ & $VP^n = $ Constant

$\Rightarrow V(nP^{n-1})\,dP + P^n dV = 0$

$nV\,dP + P\,dV = 0$

$\left[-\frac{V\,dP}{dV} = \frac{P}{n} = B\right]$

(42). $\varepsilon = -\frac{d\Phi}{dt} = -6t + 4$

at $t = 2$ Sec

$|\varepsilon| = |-6\times2+4| = 8$ Volt

(43) $\vec{v} \parallel \vec{B}$ $\vec{F} = 0$

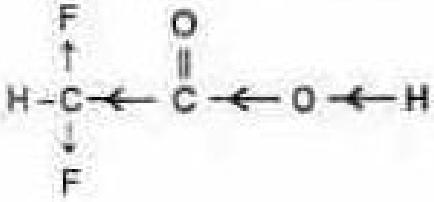
(44) (1)

(45) $R \propto l$ and Area remain Constant

$\frac{R_1}{R_2} = \frac{l_1}{l_2} \Rightarrow \frac{R_1}{R_2} = \frac{1}{2} \Rightarrow R_2 = 2R_1 = 4\Omega$

46. Gold has higher reduction potential than iron. Hence, Fe is easily oxidised to Fe^{2+}

47. Fluoro group causes negative inductive effect increasing ionisation thus 0.1 M difluoroacetic acid has highest electrical condcutivity.



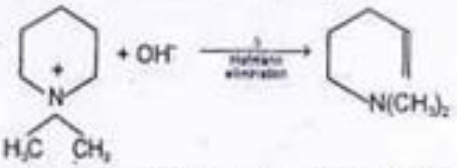
48. The safest and most common alternative of sugar is aspartame.

49. Plexiglass is commercial name of polymethyl methacrylate. It is used as substitute of glass and making decorative material.

50. Action of alcoholic caustic potash on chloroform and aniline forms a bad smelling compound phenyl isocyanide.

$$\underset{\text{Aniline}}{C_6H_5NH_2} + \underset{\text{Chloroform}}{CHCl_3} + 3KOH(alco.) \rightarrow \underset{\text{Phenyl isocyanide}}{C_6H_5NC} + 3KCl + 3H_2O$$

This reaction is called carbylamine reaction.

51. 

52. Addition of HCN is nucleophilic addition. Greater the electron deficiency of carbonyl group higher the rate of reaction. Hence, the order is as

$$Ph-\overset{O}{\overset{\|}{C}}-Ph < Ph-\overset{O}{\overset{\|}{C}}-CH_3 < CH_3-\overset{O}{\overset{\|}{C}}-CH_3 < H-\overset{O}{\overset{\|}{C}}-H$$

53. $3C_2H_2 \xrightarrow{\text{Polymerisation}} C_6H_6$

ΔH = enthalpy of product − enthalpy of reactant

$= 85 - 3(230)$

$= 85 - 690$

$= -605 \text{ kJ mol}^{-1}$

54. The correct order of bond angle is as:

H_2S	<	NH_3	<	SiH_4	<	BF_3
92.6°		107°		109°28′		120°

55. ∵ On passing 96500 C silver deposited = 108 g

∴ On passing 9650 C silver will deposite

$$= \frac{108}{96500} \times 9650$$

$= 10.8 \text{ g}$

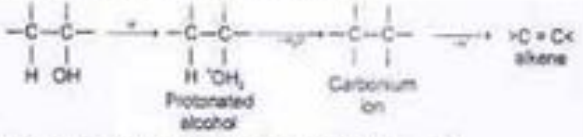
56. $\text{rms velocity} = \sqrt{\frac{3RT}{M}}$

$$\left(\sqrt{\frac{3RT}{M_1}}\right)_{O_2} = \left(\sqrt{\frac{3RT}{M_2}}\right)_{SO_2}$$

$$\sqrt{\frac{303}{32}} = \sqrt{\frac{T}{64}}$$

$$T = \frac{303 \times 64}{32} = 606 \text{ K}$$

57. During dehydration of alcohols to alkenes by heating with conc. H_2SO_4 the initiation step is protonation of alcohol molecule.



58. $[MnCl_4]^{2-}$: Number of unpaired $e^- = 5$

$[CoCl_4)]^{2-}$: Number of unpaired $e^- = 3$

$[Fe(CN)_6]^{4-}$: Number of unpaired $e^- = 0$

Magnetic moment = $n\sqrt{n+2}$

where n = Number of unpaired e^-

Greater the number of unpaired electrons, greater the magnetic moment. Hence the order of magnetic moment is as

$$[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$$

59. $2NO_{2(g)} \rightleftharpoons 2NO_{(g)} + O_{2(g)}$

$K_p = K_C(RT)^{\Delta n}$

$\Delta n = 3 - 2 = 1$

$K_p = K_C(RT)^1$

$K_p = K_C RT$

$K_p > K_C$

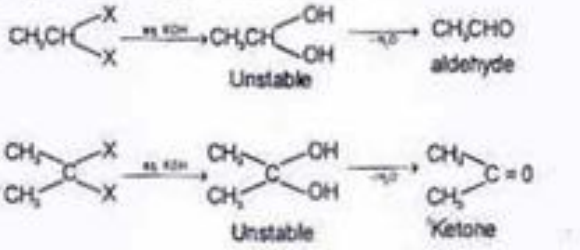
60. $Fe^{3+} + Zn^{2+} + Cu^{2+} \xrightarrow{4NH_4OH} \underset{\text{Brown ppt.}}{Fe(OH)_3} + \underset{\text{Soluble}}{[Zn(NH_3)_4]^{2+}} + \underset{\text{Soluble}}{[Cu(NH_3)_4]^{2+}}$

62. The solution of acetone and benzene shows positive deviation because the interaction between acetone and benzene molecule is lesser than the interaction between like molecules i.e. in between acetone or in between benzene.

63. Potassium dichromate ($K_2Cr_2O_7$) has no unpaired electrons but it is orange coloured compound.

64. Iron pyrite (FeS_2) is the sulphide ore of iron.

65. Gem dihalides are hydrolysed with aqueous KOH to give aldehydes on ketones.



67. $X \rightleftharpoons Y + Z$

$a \quad a \quad a$

$a-x \quad x \quad x$

$$P_x' = P\frac{(a-x)}{(a+x)} = \frac{P}{7}$$

$$7a - 7x = a + x$$

$$6a = 8x$$

$$x = \frac{6a}{8} = \frac{3a}{4}$$

$$K_p = \frac{x^2}{(a-x)}\frac{[P]}{[a+x]}$$

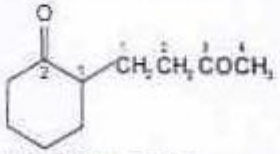
$$= \frac{\left(\frac{3a}{4}\right)^2[P]}{\left(a-\frac{3a}{4}\right)\left(a+\frac{3a}{4}\right)}$$

$$= \frac{9a^2 \times 4 \times 4 \times P}{16 \times a \times 7a}$$

$$K_p = \frac{9P}{7}$$

68. The enthalpy of neutralization of weak acid with strong base is always lesser than the strong acid with strong base. Therefore, the enthalpy of neutralisation of NaOH with CH_3COOH is 55 KJ and with HCl is 57.1 KJ. This is due to that weak acid is not completely dissociated. Hence, some of heat is utilised for complete ionisation of weak acid. i.e. CH_3COOH.

69. The order of a reaction is not a theoretical concept. It is the sum of the powers to which the concentration terms are raised in the rate law expression as observed experimentally.

70. 

2-(3-oxobutyl)cyclohexan-1-one

71. Common salt and sugar both are soluble in water but common salt dissolves in water but not in alcohol. Hence, alcohol is preferred over water for crystallization of sugar.

72. Molecular solids have low melting points and are poor conductor of heat and electricity.

73. $V\alpha\frac{1}{\sqrt{r}}, V_A\alpha\frac{1}{\sqrt{r}}, V_B\alpha\frac{1}{\sqrt{4r}}$

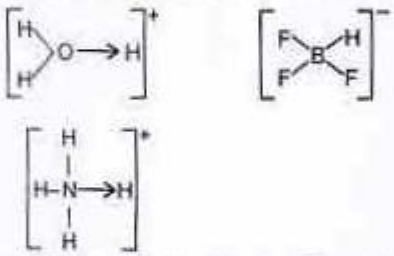
$$\frac{V_A}{V_B} = 2$$

$$t_A/t_B = \frac{2\pi r/V_A}{2\pi 4r/V_B} = \frac{1}{4}\frac{V_B}{V_A}$$

$$= \frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$$

$$\therefore \quad \frac{t_A}{t_B} = 1:8$$

74. Only HF_2^- has H-bonding [F – H – F⁻] rest all the molecules have co-ordinate bonds;



75. Isotonic solutions have same molar concentrations

6 g urea/litre = 0.1 M

34.2 g sucrose/litre = 0.1 M

76. $\because \quad 1\,M\,H_2SO_4 = 2N\,H_2SO_4$

$$N_1V_1 = N_2V_2$$

$$2 \times V_1 = 10 \times 1$$

$$V_1 = \frac{10}{2} = 5\text{ ml}$$

77. $Zn \longrightarrow Zn^{2+} + 2e^-$, $E^\circ = +0.76V$

$Ag_2O + H_2O + 2e^- \longrightarrow 2Ag + 2OH^-$, $E^\circ = 0.34V$

Adding, $E^\circ_{Cell} = 0.76 + 0.34$

$= 1.10\,V$

78. $CaCl_2$ and $MgCl_2$ are deliquescent salts and absorb moisture from air to impart hygroscopic nature to crude common salt.

79. Anhydrone cannot be used to dry organic matter since it being a strong oxidising agent causes explosions.

80. A mixture of Al powder and $Al(NO_3)_3$ is known as 'Ammonal'. It is used in bombs.

81. Since the electronegativity of X in $\ddot{N}X_3$ decreases from F to I hence, the tendency of N to donate its lone pair of electrons increases and therefore NI_3 is the most basic trihalide of nitrogen.

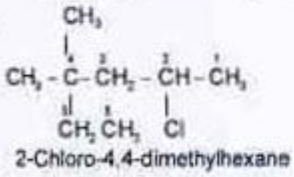
82. In etching of glass, HF reacts with Na_2SiO_3 and $CaSiO_3$ present in glass to give Na_2SiF_6 and $CaSiF_6$

$$Na_2SiO_3 + 6HF \longrightarrow Na_2SiF_6 + 3H_2O$$

$$CaSiO_3 + 6HF \longrightarrow CaSiF_6 + 3H_2O$$

83. PCl_3 is stored in a well stoppered bottle because it reacts with moisture of air.

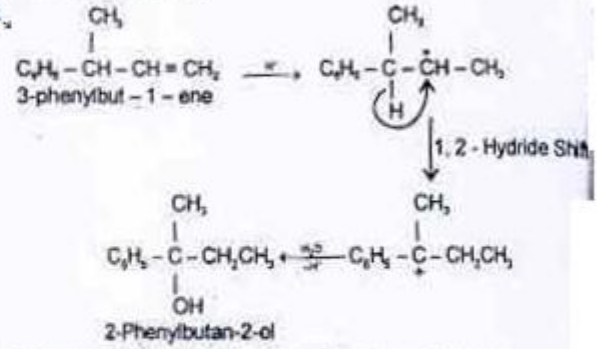
$$PCl_3 + 3H_2O \longrightarrow H_3PO_3 + 3HCl$$

84. 
2-Chloro-4,4-dimethylhexane

85. 1, 1-Dichloro-1-pentene does not show geometrical isomerism since it has two identical atoms of chlorine on C_1.

86. $P-NO_2-C_6H_4-CH_2^-$ is the most stable carbanion since electron withdrawing $-NO_2$ group stabilizes the carbanion by dispersal of the negative charge.

87. Symmetrical alkene i.e. $CH_3CH = CHCH_3$ gives the same product obeying Markovnikov's rule and peroxide effect.

88. 
3-phenylbut – 1 – ene
1, 2 - Hydride Shift
2-Phenylbutan-2-ol

89. The order of increasing boiling point is

$$CH_3COCl < CH_3COOH < (CH_3CO)_2O < CH_3CONH_2$$

91. (1) Definition of biological species was given by Ernst Mayr. In unicellular organisms, reproduction is synonymous with growth.
92. (3) page no. 26, 2nd paragraph
93. (3) page no.20, 2.2 Kingdom Protista
94. (3) NCERT XI page 30
95. (3) NCERT XI page 33
96. (4) ER – Formation of new nuclear membrane
97. (3) Plasmalemma
98. (3) complete permeability
99. (1) Golgi complex releases Calcium pectate a chemical substance that forms the cell plate.
100. (2) Post mitotic gap of interphase is G^1 phase. In G_1 phase RNA or DNA replication does not take place.
101. (1) NCERT pg no 74, 75
102. (1) Edible part of coconut is endosperm
103. (3) NCERT pg no 73
104. (2) page no. 85, last paragraph
105. (1) page no. 87 , last paragraph
106. (1) Diffusion pressure deficit or suction pressure
107. (2) decrease
108. (4) Pg. no. 204
109. (3) Pg. no. 197
110. (3) HSC pg no 72
111. (1) NCERT pg no 214
112. (1)

113. (1) Factional Question
114. (2) Yeast is an aerobic organism which can survive under anaerobic conditions too.
115. (3) page no 232 , 1st paragraph
116. (2) NCERT XI page 248
117. (2) NCERT XI page 251
118. (4) NCERT XI page 247
119. (1) NCERT XII page 6
120. (4) 8
121. (4) 13
122. (4) Seedling stage
123. (1) page no 89, 5.6.2 Mendelian disorders
124. (2) page no. 78 , 1st Paragraph
125. (1) page no 89 , Haemophilia
126. (2) They are also called luxury genes. These are those genes which are not always expressing themselves in the cell rather are expressed when required.
127. (4) NCERT XII, Pg. no. 111
128. (1) Mg^{2+} governs the association of two subunits of ribosome.
129. (4) Pollen grains are haploid ; thus n =14 (for a plant 2n = 28 and callus = 14 too)
130. (2) NCERT XII page 176
131. (4) NCERT pg no 183
132. (4) NCERT pg no 187
133. (1) fungus and algae
134. (2) rate of immigration, natality rate, mortality rate
135. (3) Esturies are the most intensively fertilized environment on the earth and thus most productive natural ecosystem on earth.
136. (4) NCERT-XII Pg.no.250
137. (4) NCERT XII page 259
138. (3) NCERT XII page 262
139. (2) HSC pg no 254
140. (3) Ozone, PAN, and nitrogen oxides produce photochemical smog
141. (4)
142. (3)
143. (3)
144. (4)
145. (1)
146. (2)
147. (2) Sperm enters secondary oocyte which then completes meiosis II.
148. (3)
149. (4)
150. (3) The rupture of RBCs is associated with release of a toxic substance haemozoin.
151. (3) Sea horse belongs to osteichthyes, Se hare belongs to mollusca,Sea cucumber belongs to Echinoderms.
152. (2) Pg 54,Last para
153. (2) Ascaris has a single host ie humans
154. (3) In the spinal cord ,white mater is around the grey mater.
155. (3) Cilliary muscles controls accommodation for viewing objects at varying distances and thus helps in vision.
156. (2) Algesireceptors are sensitive to pain stimulus.
157. (1) Glucagon causes proteolysis.
158. (2) Pg 334 ,2nd para

159. **(1)** Corpus luteum produces progesterone.Oxytocin is released by posterior pituitary gland.Growth hormone is by anterior pituitary.

160. **(3)**

161. **(2)** Pg 312, NCERT XI

162. **(1)** Pg 309, NCERT XI

163. **(4)**

164. **(4)**

165. **(2)**

166. **(2)**

167. **(3)**

168. **(3)**

169. **(1)**

170. **(3)**

171. **(1)**

172. **(4)** Liver doesn't store bile. Gall bladder does.

173. **(4)**

174. **(2)** If you look at the grid lines, It takes 0.8 seconds to complete one heartbeat. So rate is 60/0.8 = 75

175. **(3)** The vessel coming out of the glomerular capillaries is EFFERENT ARTERIOLE.Minimum reabsorption in the nephron takes place in HENLE's LOOP. As the filtrate passes through the ascending limb of Henle's loop it becomes HYPOTONIC.

176. **(1)**

177. **(2)** Carbohydrates in the chyme are hydrolysed by pancreatic amylase into Disaccharides. Nucleases in the PANCREATIC juice acts on nucleic acids to form nucleotides and nucleosides.

178. **(3)** The partial pressure of oxygen in inspired air is GREATER THAN partial pressure of oxygen in alveolar air.

179. **(3)**

180. **(2)** About 23% of total blood enters kidney per minute. Thus it will take about 4 minutes for the entire blood to pass through the kidneys