ALLEN CAREER INSTITUTE
KOTA (RAJASTHAN)
Path to Success

MAJOR TEST # 02

ALLEN NEET-UG | **DATE : 23 - 03 - 2013**

SYLLABUS - 02

ANSWER KEY

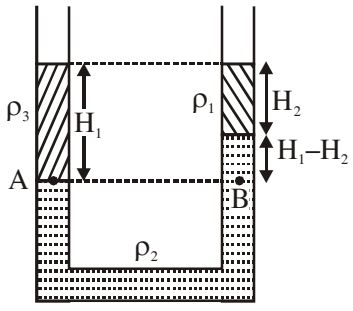
Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A.	2	2	2	1	2	1	4	1	1	2	4	1	2	2	4	3	1	1	4	3
Q.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A.	1	1	1	2	3	4	1	4	2	1	1	1	2	1	1	2	3	1	3	3
Q.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
A.	4	4	3	3	3	1	2	3	2	2	1	2	1	1	3	1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

HINT – SHEET

6. Centre of mass rises a distance of r
So work done = mgr

7. $$\frac{\Delta W}{\Delta Q} = 1 - \frac{1}{\gamma} = 1 - \frac{1}{\left(\frac{5}{3}\right)} = \frac{2}{5}$$

8.



As points A and B are in same horizontal level so
$\rho_3 g H_1 = \rho_1 g H_2 + \rho_2 g(H_1 - H_2)$
$\Rightarrow 3\ell_3 = 2\rho_1 + \rho_2$

9. Slowly (IT) $\Rightarrow P_1V_1 = P_2V_2$

$$\Rightarrow 1 \times V = P\left(\frac{V}{4}\right)$$

$$\Rightarrow P = 4 \text{ atm}$$

Suddenly (AD) $\Rightarrow P_1V_1^{\gamma} = P_2V_2^{\gamma}$

$$\left(\gamma = \frac{3}{2}\right) \Rightarrow PV^{\gamma} = P'\left(\frac{V}{4}\right)^{\gamma}$$

$$\Rightarrow P' = 8 \text{ atm}$$

10. acceleration of ball in water = $g\left(\frac{P_L}{P_B}-1\right)$

velocity of ball when ball enter in water

$v = \sqrt{2gh}$

maximum depth

$$= \frac{v^2}{2a} = \frac{2gh}{2g\left(\frac{P_L}{P_B}-1\right)} = \frac{9}{\left(\frac{10^3}{0.4\times10^3}-1\right)}$$

$= 6$ cm

12. $w = 8\pi R^2T = 8 \times 3.14 \times (10 \times 10^{-2})^2 \times \frac{3}{100}$

$= 75.36 \times 10^{-4}$ J

13. $PV = nRT = \frac{m}{M_w}RT \Rightarrow \frac{V}{T} \propto \frac{m}{P}$

14. Tension in wire is same then $\Delta\ell$ is also same

15. $\frac{P}{\rho} = \frac{RT}{M_W} \Rightarrow \rho_{mix} = \frac{\rho_{min}\, M_{w_{mix}}}{R\ T_{mix}}$

$$\rho_{mix} = \frac{(1\times10^5)\times(36\times10^{-3})}{8.31\times290} \quad \left[\begin{array}{l} M_{w_{mix}} = \frac{M_{mix}}{\mu_{mix}} \\ \qquad = \frac{7+11}{\frac{7}{28}+\frac{11}{44}} \\ M_{w_{mix}} = 36 g/mole \end{array}\right.$$

$$= \frac{3600}{2400}$$

$\Rightarrow \rho_{mix} \simeq 1.5$ Kg/m^3

16. Work $= \frac{1}{2}F\Delta\ell = \frac{1}{2}\frac{AY}{L}(\Delta\ell)^2$

$$0.4 = \frac{1}{2}\times\frac{(10^{-2}\times10^{-4})\times Y\times(0.2\times10^{-3})^2}{1}$$

$Y = 2 \times 10^{11}$ N/m^2

17. $V = $ const. $\Rightarrow P \propto T$

if $P_F = 2P_i$ then $T_F = 2T_i$

$$\Delta Q_V = \mu C_V \Delta T \quad \left[\begin{array}{l} C_V = 3\frac{J}{gK} \\ C_V = M_W C_V = 12\frac{J}{mol-k} \end{array}\right.$$

$$= \frac{1}{2}\times12\times273$$

$\Rightarrow \Delta Q_V = 1638$ J

18. Source ·))) $\xrightarrow{v'}$ | high cliff

frequecny observed by cliff

$f = f_0\left(\frac{v}{v-v'}\right)$

frequency observed by source

$f' = f\left(\frac{v+v'}{v}\right)$

$= f_0'\left(\frac{v}{v-v'}\right)\left(\frac{v+v'}{v}\right)$

$2f_0 = f_0\left(\frac{v+v'}{v-v'}\right)$

$2v - 2v' = v + v'$

$v = 3v'$

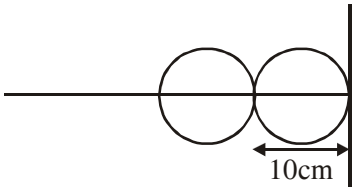
$v' = \frac{v}{3}$

19. $E_T = \frac{3}{2}PV \Rightarrow P = \frac{2E_T}{3V}$

$\Rightarrow P = \frac{2\times3735}{3\times1\times10^{-3}} \simeq 25 \times 10^5\ \frac{N}{m^2}$

$\Rightarrow P = 25$ atm

20.



$\frac{\lambda}{2} = 10$

$\lambda = 20$cm

$v = f\lambda$

$v = 100\times\frac{20}{100} = 20$

21. $V \propto \frac{T}{P}$

23. $\frac{(V_{rms})_{O_2}}{(V_{rms})_{H_2}} = \sqrt{\frac{(M_w)_{H_2}}{(M_W)_{O_2}}}$

$\Rightarrow \frac{0.5}{(V_{rms})_{H_2}} = \sqrt{\frac{2}{32}}$

$\Rightarrow (V_{rms})_{H_2} = 2$ km/s

24. $f' = f_0\left(\frac{v+v_0}{v-v_s}\right)$

$\frac{f}{f_0}=\frac{v+v_0}{v-v_s}$

25. Here $T \propto V^2$ and $PV = nRT$

$\Rightarrow PV^{-1}$ = constant

$\Rightarrow x = -1$

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

$= 2R$

26. $\lambda = L$

$\lambda = L$

$f = \frac{v}{L}$

$f^1 = \frac{5v}{4L}$

$\frac{5v}{4L}=\frac{v}{L}+100$

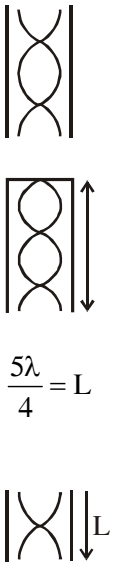
$\frac{5v}{4L}-\frac{v}{L}=100$

$\frac{5v-4v}{4L}=100$

$\frac{v}{4L}=100$

f_0 = fundamental

$f = \frac{v}{2L}=200$



$\frac{5\lambda}{4}=L$

$\frac{\lambda}{2}=L$

$\lambda = 2L$

27. $\frac{\theta_1-\theta_2}{t}=K\left[\frac{\theta_1+\theta_2}{2}-\theta_0\right]$

$\Rightarrow \frac{80-64}{5} = K\left[\frac{80+64}{2}-\theta_0\right]$ ...(i)

$\Rightarrow \frac{80-52}{10} = K\left[\frac{80+52}{2}-\theta_0\right]$ ...(ii)

equation (i) divide by (ii), then $\theta_0 = 24°C$

28. $\frac{V_1}{V_2}=\sqrt{\frac{T_1}{\mu_1}\times\frac{\mu_2}{T_2}}$

$\frac{V_1}{V_2}=\sqrt{\frac{1L_1}{2m_1}\times\frac{m_2}{L_2}}$

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

$= \frac{1}{2\sqrt{2}}$

29. $P = \frac{Q}{t} = e_r\,\sigma A T^4$ $\quad \left[T=\frac{b}{\lambda_m},\ A = 4\pi r^2\right]$

$P \propto \frac{r^2}{\lambda_m^4}$

$\Rightarrow \frac{P_A}{P_B}=\left(\frac{r_A}{r_B}\right)^2\times\left(\frac{\lambda_{m_B}}{\lambda_{m_A}}\right)^4$

$\Rightarrow \frac{P_A}{P_B}=\left(\frac{2}{3}\right)^2\times\left(\frac{900}{600}\right)^4=\frac{9}{4}=2.25$

30. 435 440 445

5 beats

for 8 beats with 437

so 445

31. $\left(\frac{dQ}{dt}\right)_{AC}=\left(\frac{dQ}{dt}\right)_{CB}$

$\Rightarrow \frac{2KA}{L}(100 - T_C) = \frac{3KA}{L}(T_C - 25)$

$\Rightarrow T_C = 55°C.$

32. $\frac{\Delta x}{\lambda}=\frac{\Delta\phi}{2\pi}$

$\frac{2.5/100}{10/100}=\frac{\Delta\phi}{2\pi}$

$0.25 \times 2\pi = \Delta\phi$

$\Delta\phi=\frac{2\pi}{4}=\frac{\pi}{2}$

33. $\frac{dQ}{dt} = \sigma AT^4$

Rate $Q = \sigma \times 4\pi R^2 \times T^4$

$\Rightarrow T = \left(\frac{Q}{4\pi R^2\sigma}\right)^{1/4}$

34. $\frac{2\pi}{\lambda}=\frac{\pi}{9}$

$\lambda = 18$ cm

35. $\frac{d^2x}{dt^2} + \pi^2 x = 0$

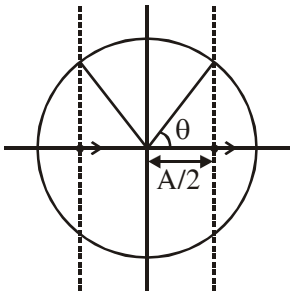
$\Rightarrow \omega^2 = \pi^2$

$\Rightarrow \omega = \pi$

$\Rightarrow 2\pi x = \pi$

$\Rightarrow x = \frac{1}{2}$

37.



$\cos\theta = \frac{A/2}{A}$

$\Rightarrow \theta = 60°$

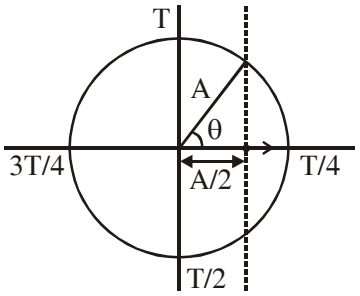
Phase difference = $\frac{\pi}{3} + \pi + \frac{\pi}{3} = \frac{5\pi}{3}$

38. $A_{max} = \sqrt{A_1^2 + A_2^2 + 2A_1A_2\cos\theta}$ $(\because \theta=90)$

$= \sqrt{9+16} = \sqrt{25} = 5$

$V_{max} = \omega A = 2.5 = 10$

39.



$\cos\theta = \frac{A/2}{A} = \frac{1}{2}$

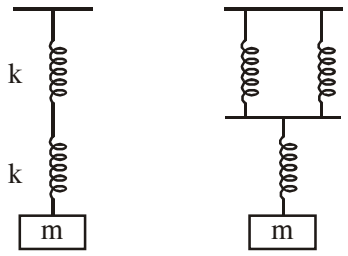
$\Rightarrow \theta = \frac{\pi}{3}$

$\Rightarrow \theta = \omega t$

$\Rightarrow \frac{\pi}{3} = \frac{2\pi}{T}t$

$\Rightarrow t = \frac{T}{6}$

40.

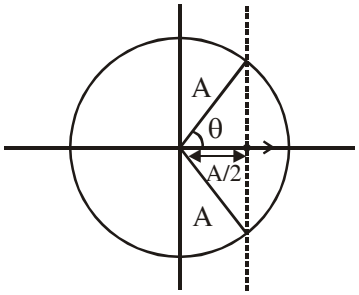


$k_{eq} = \frac{k}{2}$ $\qquad$ $k_{eq} = \frac{2k}{3}$

$T_1 = 2\pi\sqrt{\frac{2m}{k}}$ $\qquad$ $T_2 = 2\pi\sqrt{\frac{3m}{2k}}$

$\frac{T_1}{T_2} = \frac{\sqrt{3}}{2}$

41.

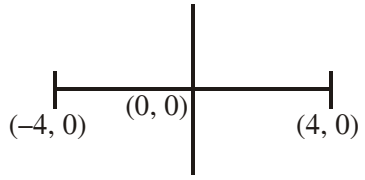


$\Rightarrow \theta = 60°$

Phase difference = $2\theta = 120°$

43. The heavy brass sphere is immersed in non-viscous liquid for all the time, for buoyant force is not affected the time period of the sphere. & restoring force is equal for in both the cases in gravitational force.

44.



$\frac{1}{2}mv^2 = \frac{1}{2}kx^2$

$\frac{1}{2}m\omega^2(A^2 - x^2) = \frac{1}{2}m\omega^2x^2$

$16 - x^2 = x^2$

$x = 2\sqrt{2}$

45. $y = 0.5\sin(2\pi ft)$

At maximum amplitude

$kx = mg$

$m\omega^2x = mg$

$4\pi^2f^2(0.5) = g$

$f = \frac{\sqrt{2g}}{2\pi}$

107. NCERT (E) Page no. # 178 [2nd and 3rd paragraph]
NCERT (H) Page no. # 178 [2nd एवं 3rd पेराग्राफ]
179 [1st पेराग्राफ]

109. NaCl is electrolyte and sucrose is nonelectrolyte. OP of electrolyte is more than OP of nonelectrolyte. More OP means less ψ_s (solute potential) because $\psi_s = -OP$
Movement of water (osmosis)
⇓
Low OP
↓
High OP
NaCl, विद्युत अपघट्य एवं सुक्रोज विद्युत अन अपघट्य है। विद्युत अपघटय का OP विद्युत अनअपघट्य के OP से अधिक होता है। अधिक OP अर्थात् कम ψ_s (विलेय विभव) क्योंकि $\psi_s = -OP$
जल की गति (परासरण)⇒ कम OP → अधिक OP

111. NCERT (E) Page no. # 182 [Topic : Imbibition]
NCERT (H) Page no. # 183 [टॉपिक - अंत शोषण]

113. NCERT (E) Page no. # 183 [Last paragraph]
NCERT (H) Page no. # 183 [अंतिम पेराग्राफ] and page -184 (1st पेराग्राफ)

115. NCERT (E) Page no. # 250 [Topic : Ethylene 2nd paragraph]
NCERT (H) Page no. # 250 [टॉपिक - एथीलिन 2nd पेराग्राफ]

117. NCERT (E) Page no. # 247 [2nd paragraph]
NCERT (H) Page no. # 247 [2nd पेराग्राफ]

119. NCERT (E) Page no. # 208 [Last 2 line]
NCERT (H) Page no. # 209 [Ist पेराग्राफ]

121. NCERT (E) Page no. # 212 [Topic : Splitting of water]
NCERT (H) Page no. # 212 [टॉपिक: जल का विघटन]

123. Total ATP from 1 Glucose = 36 ATP, 4 ATP from substrate level phosphorylation (2ATP from glycolysis and 2 ATP from krebs cycle) remaining 32 ATP in ETS (oxidative phosphorylation)
1 ग्लूकोज से कुल ATP = 36 ATP
4 ATP सबस्ट्रेट लेवल फॉस्फोराइलेशन से (2ATP ग्लाइकोलाइसिस से एवं 2ATP क्रेब्स चक्र से)
बाकी 32 ATP, ETS में (ऑक्सीकारी फॉस्फोरिलीकरण)

125. NCERT (E) Page no. # 248 [Topic : Auxin 2nd paragraph]
NCERT (H) Page no. # 248 [टॉपिक: ऑक्सिन]

127. NCERT (E) Page no. # 247 (2nd para) and page-248 [Topic : Auxin]
NCERT (H) Page no. # 247 (2nd पेराग्राफ) एवं page-248 [टॉपिक: ऑक्सिन]

129. NCERT (E) Page no. # 197 & 198
NCERT (H) Page no. # 197 & 198

131. In CAM plants complete photosynthesis (light reaction + Dark reaction) occurs in mesophyll cells. Photophosphorylation is the part of light reaction.
CAM पादपों में पूरा प्रकाश संश्लेषण (प्रकाशिक अभिक्रिया + अप्रकाशिक अभिक्रिया) पर्ण मध्योतक कोशिकाओं में होता है। प्रकाश फॉस्फोरिलीकरण, प्रकाशिक अभिक्रिया का भाग है।

133. NCERT (E) Page no. # 242 & 243 (Topic : Growth rates)
NCERT (H) Page no. # 242 एवं 243 (टॉपिक : वृद्धि दर)

135. NCERT (E) Page no. # 228 & 229 (Topic : Glycolsysis)
NCERT (H) Page no. # 229 & 230 (टॉपिक : ग्लाइकोलिसिस)

137. NCERT (E) Page no. # 181 & 182 (Topic : Plasmolysis)
NCERT (H) Page no. # 182 (टॉपिक : जीवद्रव्य कुंचन)

139. NCERT (E) Page no. # 196 (2nd & 3rd paragraph)
NCERT (H) Page no. # 196 (2nd एवं 3nd पेराग्राफ)

141. NCERT (E) Page no. # 202 (1st paragraph)
NCERT (H) Page no. # 202 (1st पेराग्राफ)

143. NCERT (E) Page no. # 214 (last paragraph) and 215 (1st para)
NCERT (H) Page no. # 215 (2nd पेराग्राफ)

145. NCERT (E) Page no. # 223 (Topic : Water)
NCERT (H) Page no. # 224 (टॉपिक: जल)

147. NCERT (E) Page no. # 230 (Topic : Fermentation)
NCERT (H) Page no. # 230 (टॉपिक: किण्वन)

149. NCERT (E) Page no. # 237
NCERT (H) Page no. # 237

151. Enzymes not consumed during reactions, they can be reutilised. 1 enzyme convert the 5 molecules of substrate into product in 20 min. so 5 enzymes convert the 25 molecules of substrate into product in 20 min.

In next 20 min the process is repeated so all the 50 substrates converts into products.
प्रक्रियाओं के दौरान एंजाइम्स खर्च नहीं होते हैं, उन्हें पुन: उपयोग किया जा सकता है।
1 एंजाइम, 20 मिनट में क्रियाधार के 5 अणुओं को उत्पाद में बदलता है तो 5 एंजाइम, 20 मिनट में क्रियाधार के 25 अणुओं को उत्पाद में बदलेंगे।
अगले 20 मिनट में यह प्रक्रिया दोहराई जायेगी अत: क्रियाधार के सभी 50 अणु उत्पाद में बदल जायेंगें।

153. Efficiency of respiration = percentage of total released energy which is converted into ATP
1 ATP = 8 Kcal so 40 ATP = 40 × 8 Kcal = 320 Kcal
In question the respiration efficiency in 50% which means the energy in ATP [320 Kcal] is 50% of total released energy so total energy is 640 Kcal.
श्वसन की दक्षता = कुल मुक्त उर्जा का वह प्रतिशत जो ATP में बदलता है।
1 ATP = 8 Kcal अत: 40 ATP = 40 × 8 Kcal = 320 Kcal
प्रश्न में श्वसन दक्षता 50% है जिसका अर्थ है ATP की ऊर्जा [320 Kcal], कुल मुक्त ऊर्जा का 50% है अत: कुल ऊर्जा 640 Kcal है।

157. NCERT (E) Page no. # 203 paragraph and figure 12.5.
NCERT (H) Page no. # 203 पेराग्राफ एवं चित्र 12.5

159. NCERT (E) Page no. # 199 (Topic : Toxicity of micronutrients)
Excess of Mn induces deficiency of iron (micronutrient) and Magnesium, calcium (macronutrient)
NCERT (H) Page no. # 199 (टॉपिक : सूक्ष्मपोषको की आविषता)
Mn की अधिकता से आयरन (सूक्ष्मपोषक) तथा मैग्नीशियम, कैल्शियम (वृहत् पोषक) की कमी हो जाती है।

161. NCERT (E) Page no. # 155 (2nd paragraph)
NCERT (H) Page no. # 155 (2nd पेराग्राफ)

163. NCERT (E) Page no. # 157 Figure 9.7
NCERT (H) Page no. # 158 चित्र 9.7

165. NCERT (E) Page no. # 240 (2nd last para), 242 (1st paragraph)
245 (2nd last paragraph), 247 (3rd paragraph), 248 (last paragraph), 252 (1st paragraph)
NCERT (H) Page no. # 240 (2nd last पेराग्राफ), 242 (1st पेराग्राफ)
245 (2nd पेराग्राफ), 247 (3rd पेराग्राफ), 248 (last पेराग्राफ), 252 (1st पेराग्राफ)

167. NCERT (E) Page no. # 202 (2nd paragraph)
NCERT (H) Page no. # 202 (2nd पेराग्राफ)

169. NCERT (E) Page no. # 232 Figure 14.3
The process shown in diagram occurs two times in mitochondria during oxidation of one glucose.
NCERT (H) Page no. # 232 चित्र 14.3
चित्र में दिखाई गयी प्रक्रिया ग्लूकोज के ऑक्सीकरण के दौरान माइटोकॉण्ड्रिया में दो बार होती है।

171. NCERT (E) Page no. # 217 Figure 13.8
NCERT (H) Page no. # 217 चित्र 13.8

173. NCERT (E) Page no. # 198 (2nd last and last paragraph)
NCERT (H) Page no. # 198 (last पेराग्राफ) एवं 199 (1st पेराग्राफ)

175. NCERT (E) Page no. # 190 & 191 (Topic : Phloem transport and pressure flow)
NCERT (H) Page no. # 191 एवं 192

177. NCERT (E) Page no. # 188
NCERT (H) Page no. # 188