ALLEN CAREER INSTITUTE
KOTA (RAJASTHAN)
path to success

DISTANCE LEARNING PROGRAMME

LEADER TEST SERIES / JOINT PACKAGE COURSE
TARGET : PRE-MEDICAL

Test Type : MAJOR   Test Pattern : NEET-UG

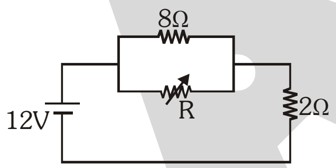
ANSWER KEY

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

HINT – SHEET

1. $\vec{A}\cdot\vec{B} = AB\cos\theta = 3\times5\times\cos60^\circ = 7.5$

2.



for max. power in 2Ω, $R \to 0$

$i = \dfrac{12}{2} = 6A$

$P = i^2R = 36 \times 2 = 72$ W

4. $V_C \propto \dfrac{1}{f}$ and $V_L \propto f$.

5. Order of slit/obstacle should be comparable to wavelength of wave used.

6. $F = \dfrac{GM_1M_2}{r^2}$

$[G] = \dfrac{[F][r]^2}{[m]^2} = [M^{-1}L^3T^{-2}]$

7. $C_{eq} = 2\mu F$

$Q_{eq} = 4\mu C$

Q on $1\mu F = 2\mu C$

Q on $2\mu F$ each $= 2\mu C$

8. Fleming's left hand rule is used to determine the direction of force.

9. COAM :- $I_1\omega_1 = I_2\omega_2$

$$\Rightarrow \frac{2}{5}MR^2 \frac{2\pi}{T} = \frac{2M}{5}\left(\frac{R}{n}\right)^2 \frac{2\pi}{T'}$$

$$T' = \frac{24}{n^2}$$

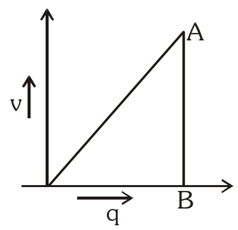
10. $\beta = \frac{\lambda D}{d} = \frac{6000\times10^{-10}\times2}{4\times10^{-3}}$

$= 3 \times 10^{-4}$ m = 0.3 mm

11. $\Delta V = -\int \vec{E}\cdot d\vec{r}$ $\therefore$ $\Delta V \propto \cos\theta$

ΔV is max. for $\theta = 0°$ or $\theta = 180°$

12.



Area = $\frac{1}{2}qV$ = Energy stored in capacitor.

13. $B = \frac{3}{4}\left[\frac{\mu_0 I}{2a}\right] + \frac{1}{4}\left[\frac{\mu_0 I}{2b}\right]$

$$B = \frac{3\mu_0 I}{8a} + \frac{\mu_0 I}{8b}$$

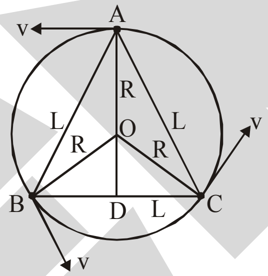
14. $\frac{K_R}{K_{Total}} = \frac{K^2/R^2}{1+\frac{K^2}{R^2}} = \frac{2}{7}$

$\left(\frac{K^2}{R^2} = \frac{2}{5}\right.$ for solid sphere)

15. Consider the circle with centre at O, and having radius R. In it consider three bodies of masses M each moving with velocity υ under the action of their gravitational attraction.

$$R = \frac{2}{3}AD = \frac{2}{3}\times L\sin 60° = \frac{2L}{3}\times\frac{\sqrt{3}}{2}$$

$\frac{L}{\sqrt{3}}$ or $L = \sqrt{3}$



Centripetal force on any one mass M is

$$= \frac{2GM^2}{L^2}\cos\left(\frac{60°}{2}\right)$$

$$\therefore \frac{M\upsilon^2}{R} = \frac{2GM^2}{L^2}\times\frac{\sqrt{3}}{2}$$

$$\text{or } \frac{GM^2}{(\sqrt{3}R)^2}\sqrt{3} = \frac{M\upsilon^2}{R}$$

$$\therefore \upsilon = \sqrt{\frac{GM}{\sqrt{3}R}}$$

16. $V = -\frac{dV}{dx} = -(4x)\hat{i}$

$$V = -4(2) = -8\hat{i}$$

18. As net force on the system = 0 (after being released)

So centre of mass of the system remains stationary.

19. $W_{AB} = -P_0(2V_0 - V_0)$
$= -P_0V_0$
$W_{BC} = 0$
$W_{CD} = +2P_0\ (3V_0 - V_0)$
$= 4P_0V_0$

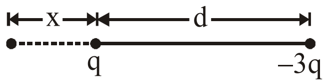
$W_{net} \Rightarrow W_{AB} + W_{BC} + W_{CD} = 3P_0V_0$

20. Amplitude = $2x_0$

so time $= \frac{T}{4} + \frac{T}{12} = \frac{T}{6}$

$\therefore$ time $= \frac{2\pi}{3}\sqrt{\frac{m}{k}}$

21. $\frac{kq}{x^2} = \frac{3kq}{(x+d)^2}$



$\Rightarrow\ x = \frac{d}{2}(1+\sqrt{3})$ to the left of q

23. Due to the same mass of A and B as well as due to elastic collision velocities of spheres get interchanged after the collision.

24. Work $= \int PdV = \int \frac{RT}{V}dV$
$V = KT^{2/3}$ ...(i)

$dV = K\ \frac{2}{3}\left(T^{2/3-1}\right)dT$

$dV = \frac{2}{3}KT^{-1/3}dT$ ...(ii)

$\frac{(ii)}{(i)} \Rightarrow \frac{dV}{V} = \frac{2}{3}\frac{dT}{T}$

work $= \int \frac{RT}{V}dV \Rightarrow \int_{T_1}^{T_2} RT\left[\frac{2}{3}\left(\frac{dT}{T}\right)\right]$

$= \int R\left(\frac{2}{3}dT\right) \Rightarrow \frac{2R}{3}(\Delta T)$

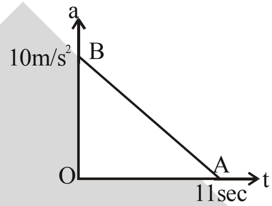
$\frac{2}{3}\times 30R \Rightarrow 20R$

25. $A\omega^2 = \alpha$
$A\omega = \beta$

So $T = \frac{2\pi\beta}{\alpha}$

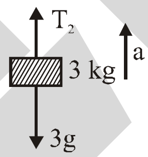
26. The area under acceleration time graph gives change in velocity. As acceleration is zero at the end of 11 sec i.e. v_{max} = Area of ΔOAB

$= \frac{1}{2}\times 11\times 10 = 55 m/s$



27. The free body diagram of 3 kg block

is as shown in the Fig (a).



(a)

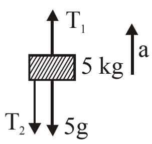
The equation of motion of 3 kg block is

$T_2 - 3g = 3a$

$T_2 = 3\ (a + g)$

$= 3(2 + 10) = 36\ N$ ...(i)

The free body diagram of 5 kg is as shown in the Fig. (b).



(b)

The equation of motion of 5 kg block is

$T_1 - T_2 - 5g = 5a$

$T_1 = 5(a + g) + T_2$

$= 5(2 + 10) + 36$ (Using (i))

$= 96\ N$

28. Since inductance is purely non-resistive, the final current when approaches to its maximum value will flow directly through the inductance and there will be no current in the 50Ω resistor.

29. i = 0, A = 60º, e = 90º

if i = 0 then $r_1 = 0$

$A = r_1 + r_2$

$A = r_2 = 60^\circ$

$\mu \times \sin r_2 = 1 \times \sin e$

$$\mu = \frac{\sin e}{\sin r_2} = \frac{\sin 90^\circ}{\sin 60^\circ} = \frac{2}{\sqrt{3}}$$

30. $\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)\text{Å}$ $\boxed{\frac{1}{\lambda} \propto Z^2}$

31. Velocity at the time of striking the floor,

$u = \sqrt{2gh_1} = \sqrt{2 \times 9.8 \times 10} = 14\text{m/s}$

Velocity with which it rebounds.

$v = \sqrt{2gh_2} = \sqrt{2 \times 9.8 \times 2.5} = 7$ m/s

∴ Change in velocity av = 7 – (–14) = 21m/s

$\therefore \text{Acceleration} = \frac{\Delta v}{\Delta t} = \frac{21}{0.01} = 2100\text{m}/\text{s}^2$ (upwards)

32. Limiting friction, f = μmg

= 0.6 × 1 × 9.8

= 5.88 N

Applied force, F = ma = 1 × 5 = 5N

As F < f, so force of friction = 5 N

33. we know $\tau = \frac{L}{R_{eq}}$ ..(1)

$\because\ R_{eq} = \frac{R \times 500}{R + 500} \Rightarrow$ By eq^n (1)

$\Rightarrow 10 \times 10^{-6} = \frac{4 \times 10^{-3}}{R(500)} \times (R + 500)$

$\Rightarrow R = 2000\ \Omega = 2\text{K}\Omega$

34. μ = 1.5, A = 60º

$i = e = \frac{3}{4}A$

i = 45º and e = 45º

δ = i + e – A

δ = 45 + 45 – 60º

δ = 30º

35. $\frac{N_1}{N_2} = \frac{N_0\left(\frac{1}{2}\right)^{\frac{2}{1}}}{N_0\left(\frac{1}{2}\right)^{\frac{2}{2}}} = \frac{1}{2}$

$\frac{A_1}{A_2} = \frac{\lambda_1 N_1}{\lambda_2 N_2} = \frac{T_2 N_1}{T_1 N_2}$ $\left[\because \lambda = \frac{693}{T}\right]$

$\frac{A_1}{A_2} = \frac{2}{1} \times \frac{1}{2} = \frac{1}{1}$

36. $\frac{R_1R_2}{R_1 + R_2} = \frac{8}{3}$ & $R_1 + R_2 = 12 \Rightarrow R_1R_2 = 32$

$\Rightarrow R_2 - R_1 = \sqrt{(R_1 + R_2)^2 - 4R_1R_2}$

$= \sqrt{12^2 - 4 \times 32} = 4\Omega$

So $R_1 = 4\Omega$ and $R_2 = 8\Omega$

Hence $\frac{\ell_1}{\ell_2} = \frac{4}{8} = \frac{1}{2}$

37. For uniform velocity, acceleration is zero. Hence resultant force will be zero.

$\therefore\ \vec{F}_1+\vec{F}_2+\vec{F}_3=0$

$(2\hat{i}-5\hat{j})+(3\hat{i}-4\hat{j})+\vec{F}_3=0$

or $\vec{F}_3=(-5\hat{i}+9\hat{j})$

38. Here intensity, $I=\dfrac{\text{power}}{\text{area}}$

$$=\frac{100\times2.5}{4\pi(3)^2\times100}=\frac{2.5}{36\pi}\text{W m}^{-2}$$

We know, $I=\dfrac{1}{2}\varepsilon_0E_0^2C$

$$\text{or}\quad E_0=\sqrt{\frac{2I}{\varepsilon_0 c}}=\sqrt{\frac{2\times\frac{2.5}{36\pi}}{\frac{1}{4\pi\times9\times10^9}\times3\times10^8}}=4.08\,\text{V m}^{-1}$$

39. $Y=\dfrac{FL}{Al}=\dfrac{1000\times100}{10^{-6}\times0.1}=10^{12}\ \text{N/m}^2$

40. The given equation is

$$y(x,t)=2\sin\left(\frac{2\pi}{3}x\right)\cos(100\,\pi t)$$

It represents a stationary wave. Therefore, all the points between consecutive nodes vibrate with same frequency and same phase but different amplitude.

41. $\dfrac{5}{R}=\dfrac{\ell_1}{100-\ell_1}$ and $\dfrac{5}{R/2}=\dfrac{1.6\ell_1}{100-1.6\ell_1}$

$\Rightarrow R=15\Omega$

43. $I=I_0\left(1-e^{-\frac{R}{L}t}\right)$

$\dfrac{e-1}{e}I_0=I_0\left(1-e^{-\frac{R}{L}t}\right)$ or $\dfrac{e-1}{e}=1-e^{-\frac{R}{L}t}$

or $\dfrac{1}{e}=\dfrac{1}{e^{\frac{R}{L}t}}$ or $\dfrac{R}{L}t=1$

or $t=\dfrac{L}{R}=\dfrac{60}{30}$ s = 2s.

44. Pressure at the bottom $P=(h_1d_1+h_2d_2)\dfrac{g}{cm^2}$

$=[250\times1+250\times0.85]=250\,[1.85]g$

$=462.5$ g dyne/cm^2

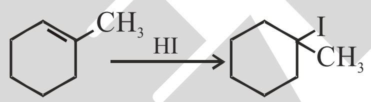
45. For open organ pipe, frequency of first harmonic,

$\upsilon=\dfrac{v}{2L}=480$ Hz

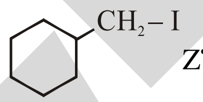
For a pipe closed at one end, frequency of first harmonic,

$\upsilon'=\dfrac{v}{4L'}=480$ Hz

$\therefore\ 4L'=2L$ or $L'=\dfrac{2L}{4}=\dfrac{L}{2}$

46. 

[Electrophilic addition reaction]

51. 

Z$^\bullet$ halide and better leaving group

56. NCERT/ XIIth/Part II/320

59. (A) $NH_4NO_2 \xrightarrow{\Delta} N_2+2H_2O$,

(B) $NH_4NO_3 \xrightarrow{\Delta} N_2O+2H_2O$,

(C) $2NaN_3 \xrightarrow{\Delta} 3N_2+2Na$.

61. Rate for E_1 $\pi\times\eta$ α stability of C^+

62. $CH_3-COOH\xrightarrow[(2)H^{\oplus}]{(1)LiAlH_4}CH_3-CH_2-OH$

63. $Cu^{2+}+KCN\longrightarrow Cu(CN)_2\longrightarrow Cu^+CN^- +\frac{1}{2}(CN)_2$

$\big\downarrow$ XS KCN

$K_3[Cu(CN)_4]$

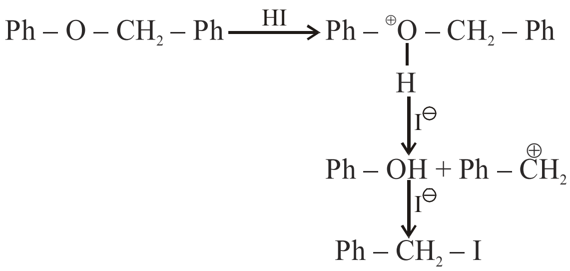
* CN^- is a pseudo halide & hence reduces Cu^{2+} to Cu^{+1}

64. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(\ell)$

$\Delta n_g = 1 - 3 = -2$

$\Delta H = \Delta U + \Delta n_g RT$

$\Delta H = \Delta U - 2RT$

66. 

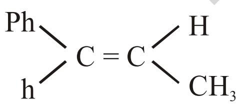
68.

(1) $[Co(OX)_2(OH)_2]$ $\Rightarrow$ Co^{+5} $t_{2g}^4 e_g^0$ UPE = 2

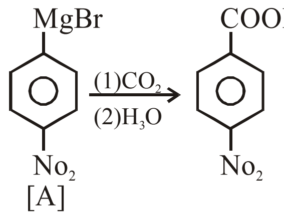
(2) $[Ti(NH_3)_6]^{+3}$ $\Rightarrow Ti^{+3}$ $t_{2g}^1 e_g^0$ UPE = 1

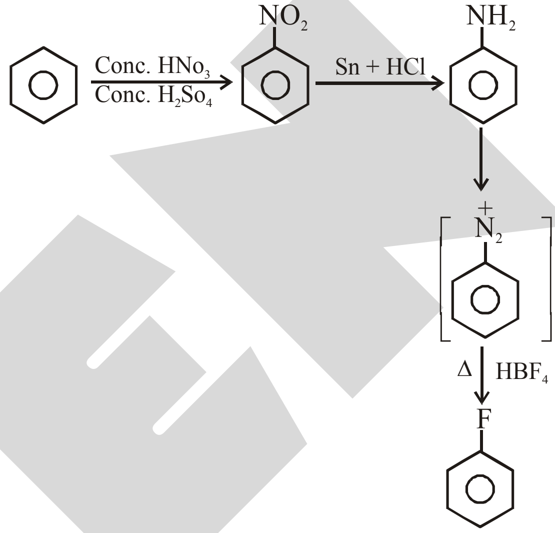
(3) $[V(gly)_2(OH)_2(NH_3)_2]^+$ $\Rightarrow$ V^{+5} $t_{2g}^2 e_g^0$ UPE = 0

(4) $[Fe(en)(bpy)\ (NH_3)_2]^{+2}$ $\Rightarrow$ Fe^{+2} $t_{2g}^6 e_g^0$ UPE = 0

72. 

73. Cr^{3+} ion is a most stable in aqueous solution due to. t_{2g} half filled configuration.

76. 

81. 

92. NCERT XII Pg. # 64, para 4.5

93. NCERT Pg.#39

98. NCERT XI Pg # 256 fig. 16.2

99. NCERT, Page#279, Para-18.1.2

102. NCERT Pg.#9

103. NCERT XI pg # 103 para 7.1.2

107. NCERT XII Pg # 140(E), 151(H)

108. NCERT XI Pg # 258

109. NCERT Pg # 236

110. NCERT Pg # 309

112. NCERT Pg.#11

113. NCERT XI pg # 115

117. NCERT XII Pg # 131(E), 141(H)

119. NCERT Pg # 233

120. NCERT Pg # 309

122. NCERT Pg.#17

127. Module-3 Pg # 127

128. NCERT XI Pg # 272

132. NCERT Pg.#19

135. NCERT XII Pg # 174 & 175, table 9.1 & 9.2

138. NCERT XI Pg # 269

140. NCERT XI$^{th|}$ Pg.#319

141. NCERT XII Pg. # 48, para 3.3

142. NCERT Pg.#20

143. NCERT XI pg # 56,57

148. NCERT, Page#293, Para-1

151. NCERT XII Pg. # 43, para 4.1

152. NCERT Pg.#22

153. NCERT XI pg # 58,59

158. NCERT, Page#293, Para-2

162. NCERT Pg.#28

165. NCERT XI Pg # 171 summary

171. NCERT XII Pg. # 50, 51 para 3.4

172. NCERT Pg.#36

175. NCERT XI pg # 168 para 3rd

178. NCERT, Page#281, Para-18.1.32