ALLEN® CAREER INSTITUTE KOTA (RAJASTHAN) path to success

DISTANCING LEARNING PROGRAMME

(Academic Session : 2019 - 2020)

PRE-MEDICAL : LEADER TEST SERIES / JOINT PACKAGE COURSE

TARGET : PRE-MEDICAL 2020

Test Type : **MAJOR TEST # 03** Test Pattern : **NEET(UG)**

TEST DATE : 10 - 08 - 2020

ANSWER KEY

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

HINT – SHEET

1. $\tan\alpha = \dfrac{b\sin\theta}{a + b\cos\theta}$

$\Rightarrow \tan 45° = \dfrac{2\sin 60°}{a + 2\cos 60°}$

$\Rightarrow a = \sqrt{3} - 1$

2. Power of combination

$P = P_1 + P_2 = 20 - 4 = 16D$

Focal length of combination

$F = \dfrac{1}{P} = \dfrac{1}{16}m = \dfrac{25}{4}cm$

$m_T = \dfrac{f - v}{f} = \dfrac{\frac{25}{4} - (-25)}{\frac{25}{4}} = 5$

3. $B_P = \dfrac{\mu_0 I}{4\pi a}\odot + \dfrac{\mu_0(2I)}{4\pi(2a)}\odot$

$B_P = \dfrac{\mu_0 I}{2\pi a}\odot$

Point P lies along two segments of wires, magnetic field due that segments is zero.

4. $F \propto \dfrac{1}{R^{5/2}} \Rightarrow F = \dfrac{GMm}{R^{5/2}} = m\omega^2 R$

$\dfrac{GMm}{R^{5/2}} = m\left(\dfrac{2\pi}{T}\right)^2 R$

$T^2 \propto R^{7/2} \quad \Rightarrow T \propto R^{7/4}$

5. $\dfrac{P_2}{P_1} = \left(\dfrac{V_1}{V_2}\right)^{r} = (8)^{5/3} = 32$

6. h' = $H-\frac{4H}{10}=\frac{6H}{10}=\frac{6}{10}\times 10=6m$

7. distance from starting point

= $\frac{1}{2}\times(4+2)\times 4-\frac{1}{2}\times(4+2)\times 2$

= 12 – 6 = 6 meter

8. Interference, diffraction and polarisation is the powerful evidence in support of wavetheory of light, further do according to options.

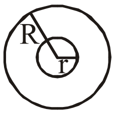
9. W = MB($\cos\theta_1 - \cos\theta_2$)

Put $\theta_1 = 0°$, $\theta_2 = 90°$

10. Using C = $n^{1/3}c \Rightarrow c = \frac{C}{n^{1/3}}=\frac{C}{(8)^{1/3}}=\frac{C}{2}=\frac{1}{2}\mu F$

11. Period of PE = $\frac{1}{2}$ period of position

12.



$\uparrow \frac{4}{3}\pi R^3\rho_w g$

$\downarrow \frac{4}{3}\pi(R^3-r^3)\rho g$

$\frac{4}{3}\pi(R^3-r^3)\rho g=\frac{4}{3}\pi R^3\rho_w g$

$9(R^3 - r^3) = R^3$

$r^3 = \frac{8R^3}{9}$

13. $\tan\theta = \mu \Rightarrow \mu = \tan 60° \Rightarrow \mu = \sqrt{3} = 1.732$

14. Here $\frac{N}{N_0}=\left(\frac{1}{2}\right)^n=\left(\frac{1}{2}\right)^{1/3}$

where n = Number of half lives $=\frac{1}{3}$

$\Rightarrow \frac{N}{N_0}=\frac{1}{1.26}\Rightarrow\frac{N_U}{N_{Pb}+N_U}=\frac{1}{1.26}$

$\Rightarrow N_{Pb} = 0.26\, N_U \Rightarrow \frac{N_{Pb}}{N_U}=0.26$

15. $\phi=\frac{\mu_0 I_C}{2\pi}\int_a^b x\,dx = MI$

$M=\frac{\mu_0 C}{2\pi}\ell n(b/a)$

16. $\Delta U = \frac{1}{2}\frac{C_1C_2(V_2-V_1)^2}{(C_1+C_2)}$

$= \frac{1}{2}\times\frac{(3\times 5)\times 10^{-12}\times(500-300)^2}{(3+5)\times 10^{-6}}$

$= \frac{15\times 10^{-12}\times 4\times 10^4}{2\times 8\times 10^{-6}} = 0.0375$ J

17. $n \propto \frac{\sqrt{T}}{\ell}$

$200 \propto \sqrt{\frac{T_1}{\ell}}$ (1)

$300 \propto \sqrt{\frac{T_2}{2\ell}}$ (2)

$\sqrt{\frac{T_2}{T_1}}=3$ eqn (2) ÷ (1)

$\frac{T_2}{T_1}=9:1$

18. Initially ice will absorb heat to raise it's temperature to 0°C then it's melting takes place If m_i = Initial mass of ice, m_i' = Mass of ice that melts and m_W = Initial mass of water

By Law of mixture Heat gained by ice = Heat lost by water

$\Rightarrow m_i \times c \times (20) + m_i' \times L = m_W c_W[20]$

$\Rightarrow 2 \times 0.5(2) + m_i'\times 80 = 5 \times 1 \times 20 \Rightarrow m_i' = 1$kg

So final mass of water = Initial mass of water + Mass of ice that melts = 5 + 1= 6 kg.

19. First case :

$\frac{1}{2}mv^2 = Fs$ ....(1)

$\frac{1}{2}\left(M+\frac{M}{2}\right)v^2 = Fs'$ ....(2)

dividing eqn. (2) by eqn. (1), $\frac{s'}{s}=\frac{3}{2}$

or s' = 1.5 s

20. $E=\frac{hc}{\lambda}=2.51ev$

D_1 & D_2 has less energy gap.

21. Only option (4) is false

22. $10I_1 = 15I_2 = 30I_3$

$I_1 = \frac{3}{2}I_2$

$I_3 = \frac{1}{2}I_2$

$I_1 + I_2 + I_3 = 1.2$

$3I_2 = 1.2$

$I_2 = 0.4A$

23. By theory

24. $Tv^{\gamma-1}$ = constant

$\gamma - 1 = .4 \Rightarrow \gamma = 1.4$ diatomic gas

25. Average angular speed = $\frac{78+0}{2} = 39$ rev/min

As the turn table stops in 30 sec, hence revolutions made by it in this time = $39 \times \frac{1}{2} = 19.5$

26. $24 = u(4) + \frac{1}{2}a(4)^2$ ...(1)

$(24+64) = u(8) + \frac{1}{2}a(8)^2$ ...(2)

(1) × 4 –(2), 8 = 8u ⇒ u =1 m/s

27. $\alpha = \frac{h_0}{f_0} = \frac{h_0}{100}$

$m_e = \frac{h_i}{h_0} = 1 + \frac{D}{f_e}$

$\Rightarrow \frac{10}{h_0} = 1 + \frac{24}{20} = \frac{44}{20}$

$h_0 = \frac{50}{11}$ cm

$\alpha = \frac{h_0}{100} = \frac{50/11}{100} = \frac{1}{22}$ = 0.0455 rad

28. $F_m = BI\ell \sin\theta$

$F_m = BI\ell_{\perp}$

$= 3 \times 5 \times \frac{5}{100}$ = 0.75 N

29. $U = \frac{Q^2}{2C}$; in given case C increases so U will decrease

30. $\vec{r} = x\hat{i} + y\hat{j}$

$\vec{r} = A \cos \omega t\hat{i} + 2A \cos \omega t\hat{j}$

Here,

x = A cos ωt —(1)

y = 2A cos ωt —(2)

from eq (1) & (2)

y = 2x

31. Initial P.E = mgh = 0.1 × 1 × 4 = 4J

Energy loss per 2m on rough surface

= μmg s

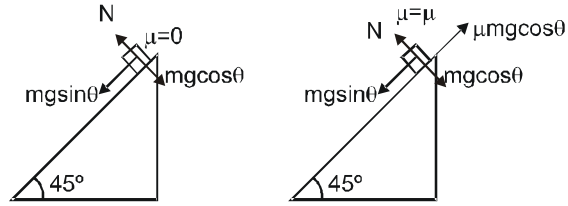
= 0.1 × 0.1 × 10 × 2 = 0.2J

So total No of rounds from B to C and C to B will be 10.

total distance travelled= 20 × 3 – 1

= 60 – 1 = 59

32.



Let acceleration in Ist case is a_1 and that in second case is a_2

Now, $\frac{1}{2}a_1t^2 = \frac{1}{2}a_2(2t)^2 \Rightarrow a_2 = \frac{a_1}{4}$ ....(i)

Clearly $a_1 = \frac{mg\sin\theta}{m}$ = g sinθ ....(ii)

and $a_2 = \frac{mg\sin\theta - \mu mg\cos\theta}{m}$ = g sinθ – μg cosθ

............(iii)

From (i), (ii) and (iii),

we get μ = 0.75.

33. Due to 10.2 eV photon one photon of energy 10.2 eV will be detected.

Due to 15 eV photon the election will come out of the atom with enery (15–13.6) = 1.4 eV.

34. t = 2 sec

$I = \frac{5}{5}(1 - e^{-\frac{t}{\tau}})$

$= 1\ (1 - e^{-1})$

35. Maximum potential difference

$= 19\frac{kV}{mm} \times 0.01$ mm = 0.19 kV = 190 V

36. $n^1 = \left(\frac{v+v_s}{v-v_s}\right) = 600\left(\frac{360}{300}\right)$ = 720 Hz

37. $F = T\ell$

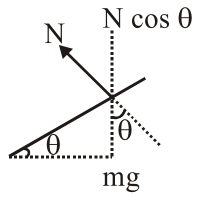
$= 0.075 \times 30 \times 10^{-2}$

$= 2.25 \times 10^{-2}$ N

38. For a banked road,

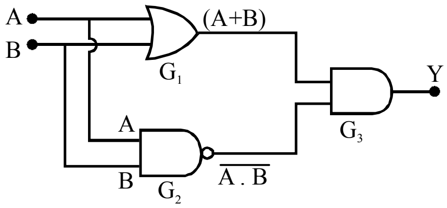
$$N \cos \theta = mg$$

$$N \sin \theta = \frac{mv^2}{R}$$



or $\tan \theta = \dfrac{v^2}{Rg}$

39.



$Y = (A+B).\overline{AB}$

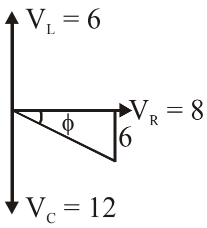
The given output equation can also be written as

$Y = (A+B).(\overline{A}+\overline{B})$ (De morgan's theorem)

$= A\overline{A} + A\overline{B} + B\overline{A} + B\overline{B} = 0 + A\overline{B} + \overline{A}B + 0 = \overline{A}B + A\overline{B}$

This is the expression for XOR gate.

40.



V = 10V

$\cos\phi = \frac{8}{10} = \frac{4}{5}$

I leads V by ϕ

41. $V_a - 6 - 5 + 3 - 6 = V_b$

$V_a - V_b = 14$ V

42. $\frac{V}{4L_1} = 3\frac{V}{2L_2}$

$\frac{L_1}{L_2} = \frac{1}{6}$

43. $\frac{dQ}{dt} = \frac{KA}{l}d\theta = \frac{0.01 \times 1}{0.05} \times 30 = 6$ J/sec

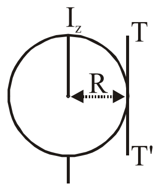
Heat transferred in on day (86400 *sec*)

$\theta = 6 \times 86400 = 518400$ J

Now Q = mL ⇒ $m = \frac{Q}{L} = \frac{518400}{334 \times 10^3}$

= 1.552 *kg* = 1552*g*.

44. $I_z = 2I$



where, $I = \frac{MR^2}{4}$

According to theorem of parallel axes, required moment of inertia about axis TT' is

$$I_{TT'} = I_z + MR^2$$

$$= 2I + MR^2 = 2I + 4I = 6I$$

45. Emitter is connected with both input and output so it is common emitter amplifier circuit.

46. $3Mg(OH)_2 + 2H_3PO_4 \longrightarrow Mg_3(PO_4)_2 + 3H_2O$

$\frac{3 \times 58.3}{2 \times 98} = \frac{100}{W}$, ∴ W = 112 g

51. $\Delta T = \frac{1000 \times K_f \times w}{M_w \times W} \Rightarrow 10 = \frac{1000 \times 1.86 \times 25}{62 \times W}$

(W_{glycol} remains constant on cooling; only water freezes)

∴ W = 75 g

∴ Ice separated = 100 – 75 = 25 g

52. The de Broglie wavelength is

$\lambda = \frac{h}{mv} = \frac{(6.626 \times 10^{-34}\,J\,s)}{(0.200\,kg)\{5m/(60 \times 60s)\}} = 2.4 \times 10^{-30}$m

58. For spontaneous process

$\Delta G = \Delta H - T\,\Delta S$ (should be negative)

$-40.2 \times 10^3 + T \times 10.2 < 0$

$T < \frac{40.2 \times 1000}{40.2}$

T < 1000 K

T < 727ºC

63. $Zn + NaOH(aq) \longrightarrow Na_2[Zn(OH)_4]$

64. a. $HgCl^{\oplus} + Cl^{\ominus} \rightleftharpoons HgCl_2$ ...K_1

b. $HgCl_2 + Cl^{\ominus} \rightleftharpoons HgCl_3^{\ominus}$ ...K_2

The eq. constant (k) for the reaction,

$2HgCl_2 \rightleftharpoons HgCl^{\oplus} + HgCl_3^{\ominus}$

Can be obtained by reversing equation (a) and adding to equation (b).

$$K = \frac{1}{K_1} \times K_2 = \frac{K_2}{K_1} = \frac{8.9}{3\times10^6} \approx 3\times10^{-6}$$

70. Let a g NH_3 is dissolved in 105 mL H_2O or 105 g H_2O

$\therefore$ % by mass of NH_3 in solution $= \frac{a}{105+a} = \frac{30}{100}$

$\therefore$ a = 45 g

$\therefore$ Weight of solution = 105 + 45 = 150 g

76. $r^+ + r^- = \sqrt{3}\times\frac{a}{2}$ $\quad \therefore a = \frac{2}{\sqrt{3}} \times 338 = 390.3$ pm

77. $(d)_1 = d$

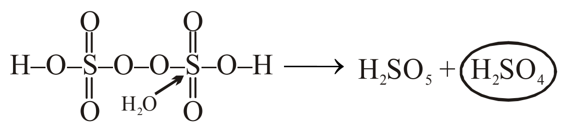
$(d)_2 = 0.75$ d

$P_1 = 1$ atm; $T_1 = 27°C = 300$ K

$P_2 = 1$ atm; $T_2 = ?$

$$\left(\frac{d_1}{d_2}\right) = \frac{P_1\times T_2}{T_1\times P_2} \text{ or } \frac{T_2}{T_1}$$

$$\therefore T_2 = \frac{d_1}{d_2}\times T_1 = \frac{d}{0.75d}\times 300 = 400K$$

82. 

83. $N_2(g) + 2O_2(g) \longrightarrow 2NO_2(g)$; $\Delta H = -X$ kJ ...(i)

$2NO(g) + O_2(g) \longrightarrow 2NO_2(g)$; $\Delta H = -Y$ kJ ...(ii)

Subtracting equation (ii) from equation (i), we get

$N_2(g) + O_2(g) \longrightarrow 2NO(g)$; $\Delta H = Y - X$

or $\Delta_f H^{\ominus}(NO) = \frac{Y-X}{2}$ kJ mol^{-1}

89. $PbSO_4(s) \rightleftharpoons Pb^{+2}(aq) + SO_4^{2-}(aq)\ (K_{sp})$ ...(i)

$HSO_4^{\ominus}(s) \rightleftharpoons H^{\oplus}(aq) + SO_4^{2-}(aq)\ (K_a)$ ...(ii)

Subtracting equation (ii) from (i), then

$$PbSO_4 + H^{\oplus}(aq) \rightleftharpoons Pb^{2+}(aq) + HSO_4^{\ominus}(aq)\ (K_{eq})$$

$$\therefore K_{eq} = \frac{K_{sp}}{K_a} = \frac{1.8\times10^{-8}}{1\times10^{-2}} = 1.8\times10^{-6}$$

91. NCERT (XI) Pg. # 18
106. NCERT- Pg# 281, para-18.1.32
109. NCERT (XIIth) Pg. # 265
123. NCERT (XII) Pg. # 137
125. NCERT-Eng, Pg. # 50
131. NCERT (XII) Pg.#182,183(E), 198,199(H)
134. NCERT (XII) Pg. # 140
135. NCERT (XI) Pg. # 102, 103
139. NCERT Pg# 107, 111, Para-6.5
143. NCERT (XI) Pg. # 38, Para 3.4
147. NCERT XII Pg. # 29, 31
152. NCERT (XII) Pg. # 34
153. NCERT (XII) Pg. # 60
156. NCERT Pg. # 57
158. NCERT XIth Pg # 91 & 92
159. NCERT (XI) Pg. # 38
161. NCERT-Eng, Pg. # 57
162. NCERT (XII) Pg. # 139
164. Module No. 5, Pg # 90
165. NCERT Pg. # 53
172. NCERT (XII) Pg.#125