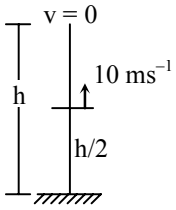
ANSWER KEY (AIPMT-2001)

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans	3	3	1	3	3	2	2	3	2	2	1	1	1	1	2	1	2	3	2	1
Ques.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans	2	2	2	2	1	1	2	1	1	1	2	3	1	1	1	1	2	1	3	2
Ques.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans	1	1	1	1	2	3	2	1	1	2	2	2	1	1	1	3	2	3	2	1
Ques.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans	2	3	1	1	1	2	1	1	2	2	2	3	3	3	1	1	3	2	1	4
Ques.	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ans	1	2	1	1	4	2	3	1	1	1	1	1	3	1	3	3	2	4	2	1
Ques.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans	2	2	1	1	4	1	1	4	1	2	2	3	4	1	1	4	4	3	3	4
Ques.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
Ans	1	4	1	3	1	1	1	2	1	3	4	2	1	4	1	1	2	1	2	1
Ques.	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Ans	1	1	1	1	4	1,2	3	1	3	3	3	1	1	2	1	2	1	2	1	2
Ques.	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Ans	2	2	3	3	4	1	2	4	2	1	3	1	1	1	1	1	2	1	1	1
Ques.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
Ans	1	2	4	4	4	2	2	3	1	1	3	3	2	2	1	2	2	2	2	4

HINTS & SOLUTIONS

5.



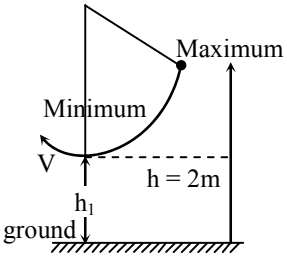
$v^2 = u^2 - 2g\,\frac{h}{2}$

$0 = (10)^2 - 10h$

$h = 10$ m

6. $K' = K\cos^2 45^\circ = K/2$

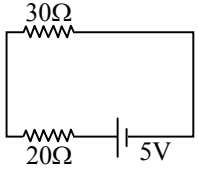
9.



Apply COME between max^m and min point

$mgh = Mgh_1 + \frac{1}{2}\,MV^2$

10. Equivalent ckt is



$I = \frac{5V}{(30+20)\Omega}$

$I = \frac{5}{50}A$

12. $E = \frac{kx^2}{2} = \frac{k^2x^2}{2k} \Rightarrow E = \frac{f^2}{2k}$

$\because$ Force is equal $\quad \therefore\ E \propto \frac{1}{k}$

16. Carnot engine is an Ideal engine so its efficiency will be will be maximum

$\therefore\ \eta_{max.} = \frac{400-300}{400} \times 100\% = 25\%$

therefore 26% efficient engine is impossible

17. Impulse = change in momentum

$F = \frac{\Delta P}{\Delta t} = \frac{150\times10^{-3}\times20}{0.1} = 30$ N

18. $n = \frac{1}{2\ell}\sqrt{\frac{T}{\pi r^2 \rho}}$

$\rho_1 = \frac{\rho}{2}$, $T^1 = 2T$ and $D^1 = 2D$ या $r_1 = 2r$

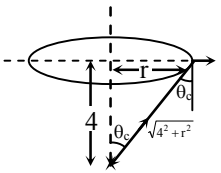
$n^1 = \frac{1}{2\ell}\sqrt{\frac{2T}{\pi(2r)^2\frac{\rho}{2}}} = \frac{1}{2\ell}\sqrt{\frac{T}{\pi r^2\rho}} = n$

$\Rightarrow$ No change

20. Apply energy consevation $\frac{-GMm}{R} + \frac{1}{2}mv^2$

$= -\frac{GMm}{2R} \Rightarrow v = \sqrt{\frac{GM}{R}}$

21.



$\sin\theta c = \frac{1}{\mu} = \frac{1}{5/3}$

$\Rightarrow \frac{r}{\sqrt{4^2+r^2}} = \frac{3}{5}$

$\Rightarrow \boxed{r = 3}$

23. Heat flow rate $= \frac{KA(T_1 - T_2)}{L} = Q$

when linear dimensions are doubled

$A_1 \propto r_1^2$, $L_1 = L$

$A_2 \propto 4r_1^2$, $L_1 = 2L_1$ so $Q_2 = 2Q_1$

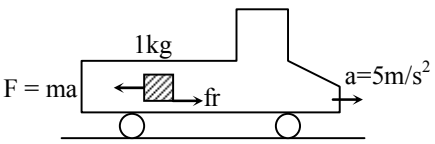
24. $\left|\vec{A} + \vec{B}\right|^2 = A^2 + B^2 + 2AB\cos\theta$

$\Rightarrow A^2 = A^2 + A^2 + 2A^2\cos\theta$

$\Rightarrow \cos\theta = -\frac{1}{2} \Rightarrow \theta = 120^\circ$

29. Energy density $= \frac{1}{2}\in_0 \frac{v^2}{d^2}$

30.



$fr_L = \mu_s.N$ pseudo force = ma

$= \mu s.mg$ $= 1 \times 5$

$= 0.6 \times 1 \times 10$ $F = 5$ N

$= 6N$

$\therefore F < fr_L$ block does not move

static firction = applied force

$\Rightarrow \boxed{fr = 5N}$

34. Solve by $x = \frac{I_\rho}{A}$

35. $I = t^2e^{-t}$

$\mathbf{e = L}\frac{d\ell}{dt}$ here emf is zero when $\frac{d\ell}{dt} = 0$

$\frac{d\ell}{dt} = 2te^{-t} - t^2e^{-t} = 0$

$\Rightarrow te^{-t}(t-2) = 0 \Rightarrow t = 2$ sec

36. $\frac{I_C}{I_E} = \alpha = 0.98$; $\frac{I_C}{I_B} = \beta = \frac{\alpha}{1-\alpha} = 49$

40. $2d\sin\theta = n\lambda$ $\because -1 \le \sin\theta \le 1$

Therefore $\lambda_{max.} = 2d \Rightarrow \lambda_{max.} = 2 \times 2.8 \times 10^{-8}$m

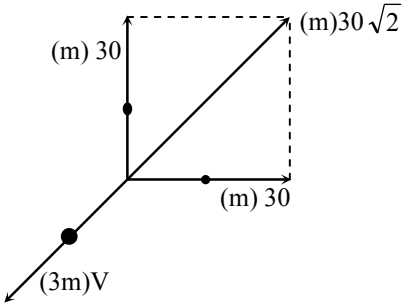
$\Rightarrow \lambda_{max.} = 5.6 \times 10^{-8}$ m

46. $\eta = \frac{\text{useful work}}{\text{total work}} = \frac{mgh}{F \times d} = \frac{(75g)\times 3}{250\times 12} = 0.75$

49. Apply conservation of linear momentum

$\Rightarrow 3mV = 30\sqrt{2}$ m

$\Rightarrow V = 10\sqrt{2}$



52. $CH_3–CH_2–CH_2–CH_3 \rightarrow CH_3–CH_2CH–CH_3$

intermediate Sp^2 hybrid planar

shape $\xrightarrow{Cl}$ recemic mix

planr shape (समतलीय आकृति) पर reagent का आक्रमण दोनों तरफ से हो सकता है।

70. $CH_4 + \frac{1}{2} O_2 \rightarrow CH_3OH$

$\Delta H = x - y$ given $\Delta H = -$ ve

Hence $x - y < 0$ $x < y$

71. $2N_2O_5 \rightarrow 4NO_2 + O_2$

this is a first order reaction

$\therefore$ rate $= K[N_2O_5]$ $[N_2O_5] = \frac{\text{rate}}{K}$

72. At the end of 25 hrs. activity = 0.01 M

half life = 6 hrs

In 24 hrs. there are $\frac{24}{6} = 4$ half life

Activity of susbtance after n half life $= \frac{(A)}{2^n}$

$\Rightarrow \frac{(A)}{2^4} = 0.01$ $(A) = 0.16$

74. Density = 1.17 gm/cc.

$\Rightarrow$ 1cc. solu. contains 1.17 gm of HCl

$\therefore$ molarity $= \frac{1.17 \times 1000}{36.5 \times 1}$

75. In peroxidase anlydrous enzyme 0.55 Se is present means, 0.5gm. Se is present in 100gm of enzyme

In a molecule of enzyme one Se atom must be present hence 78.4 gm Se will be present in

$\frac{100}{0.5} \times 78.4 = 1.568 \times 10^4$

76. Sp. vol (vol. of 1gm) cylindrical virus particle $= 6.02 \times 10^{-2}$ cc/gm

radius of virus r = 7Å $= 7 \times 10^{-8}$ cm

length of virus $= \pi r^2 \ell$

$= \frac{22}{7} \times (7 \times 10^{-8})^2 \times 10 \times 10^{-8} = 154 \times 10^{-23}$cc

wt. of one virus particle $= \frac{\text{Vol.}}{\text{Sp.vol.}}$

$\Rightarrow \frac{154 \times 10^{-23}}{6.02 \times 10^{-2}}$ gm

$\therefore$ mol. wt. of virus = wt. of N_A particles

$= \frac{154 \times 10^{-23}}{6.02 \times 10^{-2}} \times 6.02 \times 10^{+23}$ gm/mol

= 15400 gm/mol = 15.4 kg/mol