Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr.IPLCO **JEE–ADVANCE** **Date: 16-08-15**
Time: 3 Hours **2012-P2-Model** **Max Marks: 198**

KEY & SOLUTIONS

PHYSICS

1	**A**	2	**D**	3	**D**	4	**C**	5	**A**	6	**D**
7	**D**	8	**C**	9	**A**	10	**C**	11	**A**	12	**A**
13	**B**	14	**C**	15	**AC**	16	**ACD**	17	**BC**	18	**AB**
19	**CD**	20	**CD**								

CHEMISTRY

21	**B**	22	**A**	23	**C**	24	**A**	25	**A**	26	**B**
27	**D**	28	**B**	29	**B**	30	**C**	31	**A**	32	**C**
33	**B**	34	**C**	35	**CD**	36	**ACD**	37	**ABCD**	38	**ABC**
39	**BC**	40	**AC**								

MATHS

41	**D**	42	**D**	43	**C**	44	**B**	45	**A**	46	**A**
47	**C**	48	**D**	49	**D**	50	**C**	51	**A**	52	**D**
53	**A**	54	**C**	55	**BCD**	56	**AC**	57	**ABC**	58	**BD**
59	**BC**	60	**ABD**								

PHYSICS

1. $\omega = \frac{V_\perp}{r} = \frac{V\sin\theta}{r} = \frac{|\vec{r}\times\vec{v}|}{r^2}$

   Or, $\vec{\omega} = \frac{\vec{r}\times\vec{v}}{r^2}$; $\vec{r} = \left(\hat{j}+\hat{k}\right)$

2. Differentiating $\hat{r}$ or $\hat{\theta}$ once by 'θ' turns the vector by 90^o in anti-clockwise direction.

3. $F = -\frac{\partial u}{\partial x} = -48$

   $@\, x = 3m$

   The block must reach atleast upto x=3 towards origin. For x<3m, the force field is sufficient to overcome friction.

6. $T\cos\theta = mg$

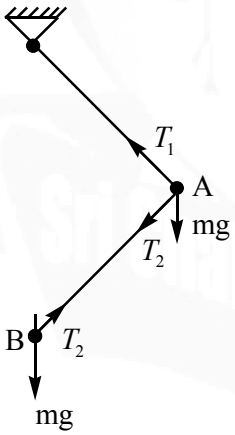
   $T\sin\theta = m\omega^2\ell\sin\theta \Rightarrow T = m\omega^2\ell$

   and $w = \sqrt{\frac{g}{\ell\cos\theta}} \geq \sqrt{g/\ell}$

9-10. In case 1, $f_{limit} = \mu m\sqrt{g^2+(r\alpha)^2}$

   In case 2, $f_{limit} = \mu[mg + mr\alpha]$

15.



$\vec{a}_A$ is perpendicular to 'OA' or along 'AB'.

$$\left.\begin{aligned} a_{B_{11}} &= \frac{mg\cos 37 - T_2}{m} \\ a_{A_{11}} &= \frac{mg\cos 37 + T_2}{m} \end{aligned}\right\} a_{B_{11}} = a_{A_{11}} \Rightarrow T_2 = 0$$

$\therefore \vec{a}_B = g \Downarrow \& a_A = g\sin 53^o$

16. $Y = Ax + Bx^2, y = 0$ at $x = 10m$ & $y = 2.5m$ *at* $x = 5m$

$$\therefore y = x - \frac{x^2}{10}$$

Radius of curvature of a given trajectory is independent of velocity of the object moving on the trajectory.

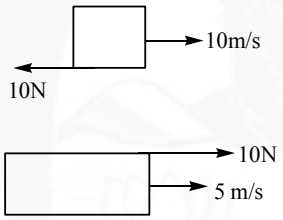
Consider a projectile with the same equation of trajectory.

$$Y = x\tan\theta_p - \frac{gx^2}{2u_p^2\cos^2\theta_p} \Rightarrow \theta_p = 45^o \;\&\; u_p = 10m/s.$$

$$\therefore R = \frac{\left(u_p\cos 45\right)^2}{a_p, n} = 5m$$

To find N, $Mg - N = MV^2/R \Rightarrow N = M\left(g - v^2/R\right) = \text{zero}$

17. $f = 2\times(10-5)$

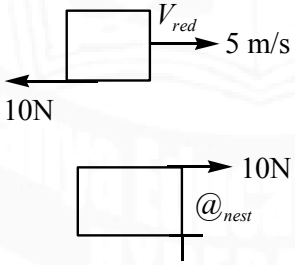


=10 N

$P_1 = -10\times 10 = -100W$

$P_2 = +10\times 5 = 50W$

$P_1 + P_2 = -50W$



w.r.t lower block,

$p_1^{\,1} = -50$

$p_2^{\,1} =$ zero

18. If a particle has a constant acceleration, it may trace a parabolic path. But parabolic path does not guarantee constant acceleration.