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: 02-08-15**
Time: 02:00 PM to 05:00 PM **2014-P2-Model** **Max Marks: 180**

PAPER-II

KEY & SOLUTIONS

PHYSICS

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

CHEMISTRY

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

MATHS

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

PHYSICS

1. In scientific notation measured mass is $1.201\times10^{-5}\,kg$. Limit of resolution of balance used is 0.1 gram in measurement some systematic error may their so true weight of object may not be in the range obtained in measurement.

2. Let distance is 'd'.

   $d(\theta)$ = diameter of earth

   $$d=\frac{diameter\ of\ earth}{\theta}=3.84\times10^{8}\,m.$$

3. At t=0, they are at same position $\Rightarrow y_2-y_1=0$. If t is the time taken by first particle to strike the ground,

   $$240=-10t+\frac{1}{2}(10)t^2\Rightarrow t=8s$$

   Up to $t=8s, a_{rel}=g-g=0\Rightarrow v_{rel}=$ constant and it is same as initial value.

   Up to $t=8s, y_2-y_1=v_{rel}t$

   $\Rightarrow$ the graph will be a straight line passing through origin.

   At $t>8s, a_1=0, a_2=g\Rightarrow a_{rel}=a_2-a_1=g$

   $\Rightarrow v_{rel}$ i.e. $|slope|$ of given graph should increase with time. Hence option (3) is correct.

4. $$a=-\frac{dv}{dt}$$

   $$kv^2=-\frac{dv}{dt},\int_0^t kdt=\int_{v_0}^{v}-\frac{dv}{v^2}$$

   $$kt+\frac{1}{v_0}=\frac{1}{v}$$

   $$v=\frac{v_0}{1+kv_0t}$$

5. $\vec{v}_c=25\vec{i}$

   $\vec{v}_{b/c}=10\cos37\vec{k}+10\sin37\vec{j}$

   $\vec{v}_{b/c}=8\vec{k}+6\vec{j}$

   $\vec{v}_b-\vec{v}_c=8\vec{k}+6\vec{j}$

   $\vec{v}_b=\vec{v}_c=8\vec{k}+6\vec{j}$

$\vec{v}_b - 25\vec{i} + 8\vec{k} + 6\vec{j}$

6. Horizontal component velocity of the projectile is constant

$V\cos(\alpha-\theta) = u\cos\theta$

$V = \dfrac{u\cos\theta}{\cos(\alpha-\theta)}$

And apply $-V_y = u_y - gt$

$t = \dfrac{u\sin\alpha}{g\cos(\alpha-\theta)}$

7. A

From graph $V = -\dfrac{V_0}{x_0}x + V_0$

$$a = \frac{dV}{dt} = -\frac{V_0}{x_0}\left(\frac{dx}{dt}\right) = -\frac{V_0}{x_0}\left(-\frac{V_0}{x_0}x + V_0\right) = \frac{V_0^2}{x_0^2}x - \frac{V_0^2}{x_0}$$

8. The rate of change of speed of the projectile is $\dfrac{d}{dt}|\vec{V}|$

Hence $\left.\dfrac{d}{dt}|\vec{V}|\right|_{\text{at half of max.height}} = \dfrac{g\tan\theta}{\sqrt{2+\tan^2\theta}}$

9. Sol: $V_{avg} = \dfrac{\text{displacement}}{\text{time}}$

Time is same for all the particles.

Displacement is distance between vertex and incentre.

10. Sol: The difference is 0.02m

11. Let $\omega_p = N^a e^b m^c \in_0^d$

Using dimensional analysis it is found that (c) is correct

12. $\omega = \omega_p = \sqrt{\dfrac{Ne^2}{m\in_0}}$

$= 3.2\times10^{15} rad/s$

$\lambda = 6\times10^{-7} m$

13. $\%error = \dfrac{\Delta L}{L}\times100\% = \dfrac{0.1}{50}\times100\% = 0.2\%$

14. $\dfrac{\Delta T}{T}\times100\% = \dfrac{0.2}{4\times60}\times100\% = 0.8\%$

15. $V_x = 2 \qquad V_y = 10\cos 2t$

$V_{max} = \sqrt{2^2+10^2} = 2\sqrt{26}$

16. Path of particle follows $y = 5\sin x$