RED Group of Institutions
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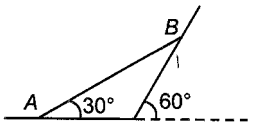
Sample Paper of Scholarship cum Admission Test for Class-XII (Non-Medical)

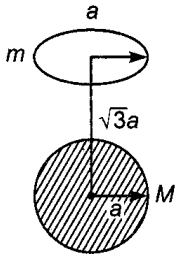
PART–1 (PHYSICS)

1. In the figure shown, the instantaneous speed of end A of the rod is v to the left. The angular velocity of the rod of length L, must be



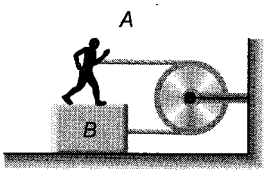
(a) v/2L (b) v/L (c) $\frac{\sqrt{3}v}{2L}$ (d) $\frac{2v}{L}$

2. A uniform ring of mass m is lying at a distance $\sqrt{3}a$ from the centre of a sphere of mass M just over the sphere (where a is the radius of the ring as well as that of the sphere). Then magnitude of gravitational force between them is



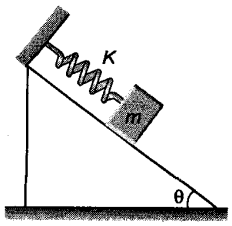
(a) $\frac{GMm}{8a^2}$ (b) $\frac{GMm}{\sqrt{3}a^2}$ (c) $\sqrt{3}\frac{GMm}{a^2}$ (d) $\sqrt{3}\frac{GMm}{8a^2}$

3. As shown in the figure, A is a man of mass 60 kg standing on a block of mass 40 kg kept on ground. The coefficient of friction between the feet of the man and the block is 0.3 and that between B and the ground is 0.2. If the person pulls the string with 125 N force, then



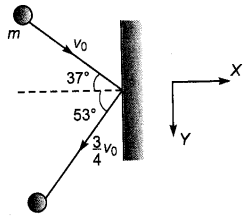
(a) B will slide on ground
(b) A and B will move with acceleration 0.5 ms^{-2}
(c) the force of friction acting between A and B will be 40 N
(d) the force of friction acting between A and B will be 180 N.

4. A system of wedge and block as shown in figure, is released with the spring in its natural length. All surfaces are frictionless. Maximum elongation in the spring will be



(a) $\frac{2mg\sin\theta}{K}$ (b) $\frac{mg\sin\theta}{K}$ (c) $\frac{4mg\sin\theta}{K}$ (d) $\frac{mg\sin\theta}{2K}$

5. A ball of mass m moving with velocity v_0 collides a wall as shown in figure. After impact it rebounds with a velocity $\frac{3}{4}v_0$. The impulse acting on ball during impact is



(a) $-\frac{m}{2}v_0\hat{j}$ (b) $-\frac{3}{4}mv_0\hat{i}$ (c) $-\frac{5}{4}mv_0\hat{i}$ (d) None of these

PART–2 (CHEMISTRY)

1. $NH_4COONH_2(s) \rightleftharpoons 2\ NH_3(g) + CO_2(g)$. If equilibrium pressure is 3 atm for the above reaction, K_p for the reaction is

(a) 4 (b) 27 (c) $\frac{4}{27}$ (d) $\frac{1}{27}$

2. Chile saltpetre is:

a) $NaNO_2$ b) KNO_2

c) $NaNO_3$ d) KNO_3

3. M g of a substance when vaporised occupy a volume of 5.6 litre at NTP. The molecular mass of the substance will be:

a) M b) 2M

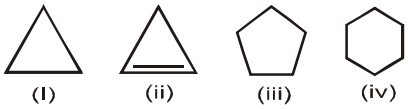
c) 3M d) 4M

4. If 4 g of oxygen difuse through a very narrow hole, how much hydrogen would have diffused under identical conditions?

a) 16 g b) 1 g

c) $\frac{1}{4}$ g d) 64 g

5. The stability of compounds:



a) (iv) > (iii) > (i) > (ii) b) (i) > (iii) > (ii) > (iv)

c) (ii) > (iii) > (i) > (iv) d) (iv) > (i) > (iii) > (ii)

PART–3 (MATHS)

11. The domain of the function $f(x)=\cos^{-1}\left(\sec\left(\cos^{-1}x\right)\right)+\sin^{-1}\left(\cos ec\left(\sin^{-1}x\right)\right)$ is

(a) $x\in R$ (b) $x=1,-1$ (c) $-1\le x\le 1$ (d) $x\in\phi$

12. If ω is a complex cube root of unity and $(1+\omega)^7=A+B\omega,$ then A and B are respectively equal to

(a) 0, 1 (b) 1,1 (c) 1, 0 (d) –1, 1

13. The number of real solutions of the system of equations $x=\frac{2z^2}{1+z^2}, y=\frac{2x^2}{1+x^2}, z=\frac{2y^2}{1+y^2}$

(a) 1 (b) 2 (c) 3 (d) 4

14. The total number of numbers that can be formed by using all the digits 1, 2, 3, 4, 3, 2, 1, so that the odd digits always occupy the odd places, is

(a) 3 (b) 6 (c) 9 (d) 18

15. The number of terms with integral coefficient in the expansion of $\left(\sqrt[4]{9}+\sqrt[6]{8}x\right)^{500}$ is

(a) 501 (b) 250 (c) 253 (d) 251