

1. A bird is flying along a straight line with velocity $v = (6-2t)$ m/s. The distance travelled by the bird in $t_1 = 2$ s to $t_2 = 5$ s is

(1) 5 m

(2) Zero

(3) 4 m

(4) 6 m

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2. A particle is moving on x-y plane so that its x coordinate varies with time as $x = \frac{t^2}{2}$, and y coordinate varies as $y = \frac{x^2}{2}$. The velocity of the particle at $t = 2$ s is

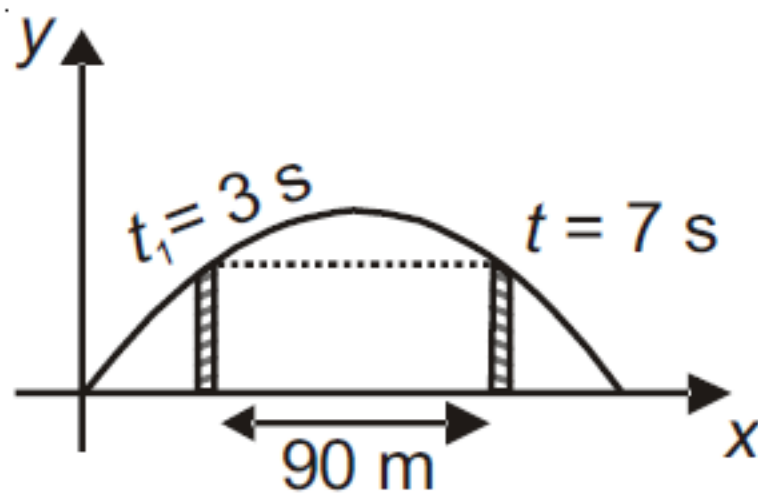
(1) $\vec{v} = (2\hat{i} + 3\hat{j}) \text{ m/s}$

(2) $\vec{v} = (2\hat{i} + 2\hat{j}) \text{ m/s}$

(3) $\vec{v} = (3\hat{i} + 4\hat{j}) \text{ m/s}$

(4) $\vec{v} = (2\hat{i} + 4\hat{j}) \text{ m/s}$

3. A projectile is thrown from the ground as shown. This distance between two vertical walls is 90 m. The range of projectile is



(1) 125 m

(2) 180 m

(3) 225 m

(4) 250 m

4. A man can swim in still water with speed v , speed of water in the river is u and the width of the river is d . Select the correct statement(s)

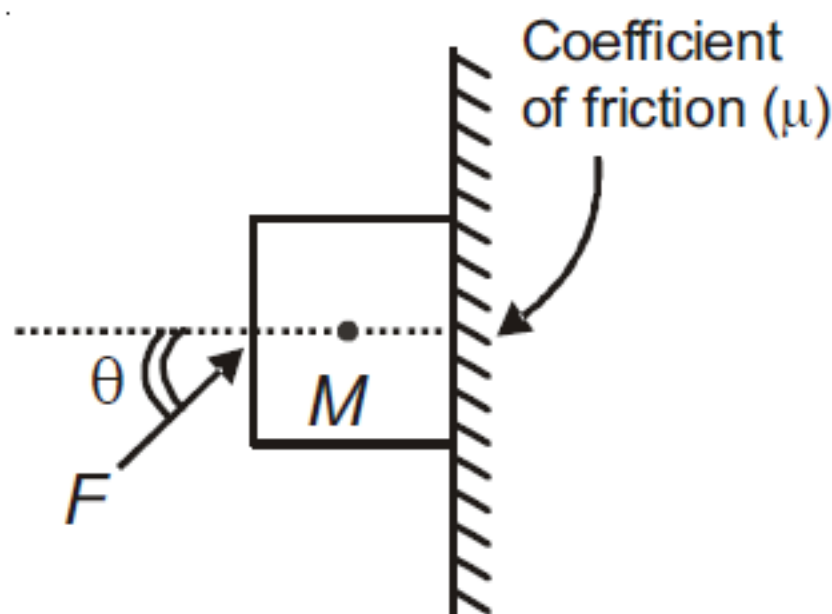
(1) Man cannot reach the point exactly opposite on the bank if $u > v$.

(2) Man can reach exactly opposite point on the bank in time $t = \frac{d}{\sqrt{v^2 - u^2}}$ if $u > v$

(3) The minimum time in which man can cross the river is $\frac{d}{v}$

(4) Both (1) & (3)

5. An external force F is applied on a block at angle θ from horizontal as shown. The minimum value of force required to keep the block stationary is



(1) $\frac{mg}{\mu \sin \theta}$

(2) $\frac{mg}{\sin \theta + \mu \cos \theta}$

(3) $\frac{mg}{\sin \theta - \mu \cos \theta}$

(4) $\frac{mg \mu \tan \theta}{\sqrt{\mu^2 + 1}}$

6. For the reaction of one mol zinc with two mol hydrochloric acid in a bomb calorimeter, ΔU and W correspond to

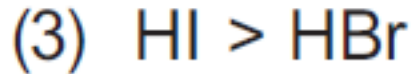
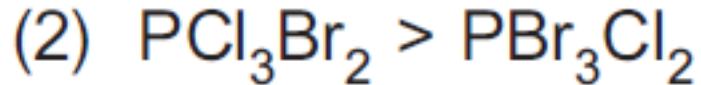
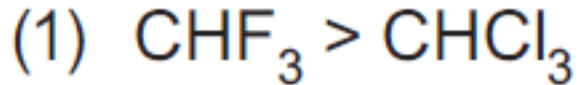
(1) $\Delta U < 0, W = 0$

(2) $\Delta U < 0, W < 0$

(3) $\Delta U > 0, W = 0$

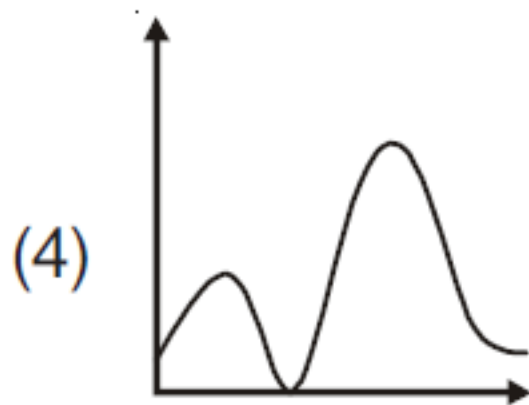
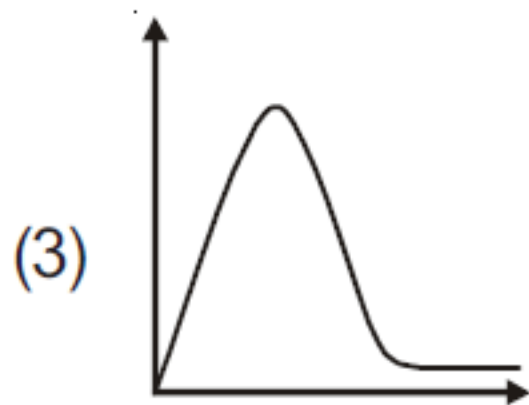
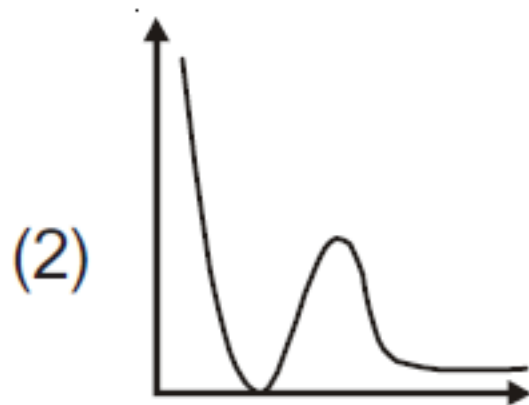
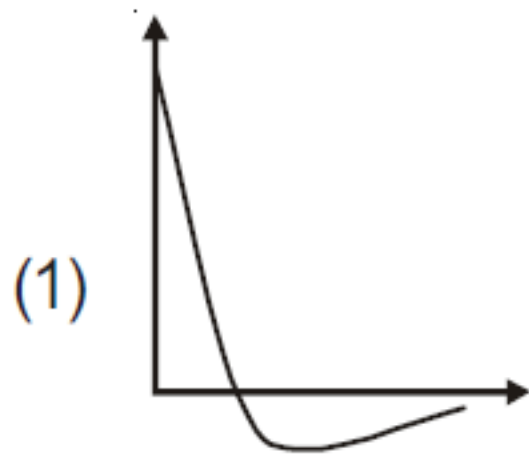
(4) $\Delta U > 0, W > 0$

7. The correct order of dipole moment is given by



(4) All of these

8. Which is the correct graph between radial probability density vs radial distance for 2s orbital?



9. The ratio of wavelength of limiting line of Paschen series for Li^{+2} to that of 1st line of visible series for He^{+} will be

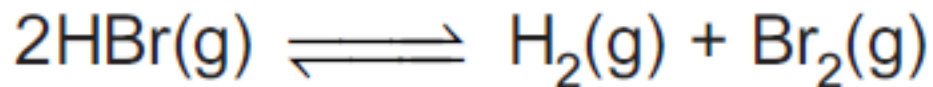
(1) $\frac{1}{3}$

(2) $\frac{3}{1}$

(3) $\frac{9}{5}$

(4) $\frac{5}{9}$

10. The equilibrium constant for the reaction



If 15 ml of H_2 reacts with 20 ml of Br_2 in one litre vessel and at equilibrium 20 ml of HBr is formed

(1) 40

(2) 20

(3) 0.125

(4) ∞