Physicsaholics

DPP – 5 (COM)

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Q 1. A particle of mass m is made to move with uniform speed v_0 along the perimeter of a regular hexagon. The magnitude of impulse applied at each corner of the hexagon is

(a) $2mv_0 \sin\frac{\pi}{6}$

(b) $mv_0 \sin\frac{\pi}{6}$

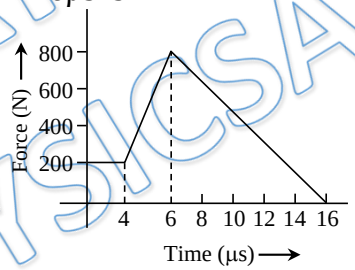
(c) $mv_0 \sin\frac{\pi}{3}$

(d) $2mv_0 \sin\frac{\pi}{3}$

Q 2. Displacement of a particle of mass 2 kg moving In a straight line varies with time as s = $(2t^3 + 2)$ m. Impulse of the force acting on the particle over a time interval between t =0 and t =1 s is:

(a) 10 N-s (b) 12 N-s (c) 8 N-s (d) 6 N-s

Q 3. The magnitude of force (in Newtons) acting on a body varies with time (in micro second) as shown in the figure. The magnitude of total impulse of the force on the body from t = 4μs to t = 16μs is –



(a) 5×10^{-2} Ns (b) 5×10^{-3} Ns

(c) 5×10^{-4} Ns (d) 5×10^{-6} Ns

Q 4. An impulse $\vec{I}$ changes the velocity of a particle from $\vec{V}_1$ to $\vec{V}_2$. Kinetic energy gained by the particle is –

(a) $(1/2)\vec{I}\,(\vec{V}_1+\vec{V}_2)$

(b) $(1/2)\,\vec{I}\,(\vec{V}_1-\vec{V}_2)$

(c) $\vec{I}\,(\vec{V}_2-\vec{V}_1)$

(d) $\vec{I}\,(\vec{V}_2+\vec{V}_1)$

Q 5. Displacement-time graph of a particle moving in a straight line is as shown in figure. Mass of the particle is 2 kg. The total Impulse imparted to the particle in a time interval from t = 0 to t = 6 sin N-s will be

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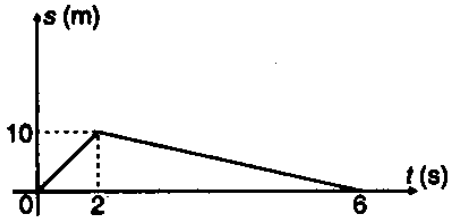
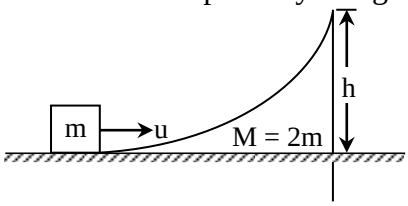


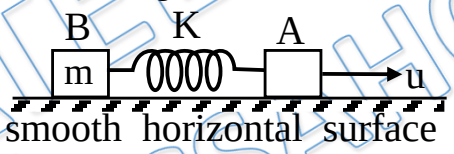
(a) 30 (b) 15 (c) – 30 (d) – 15

Q 6. A block of mass m is moved towards a movable wedge of mass M = 2m and height h with velocity u (All surfaces are smooth). If the block just reaches the top of the wedge, the magnitude of horizontal impulse by wedge on block is –



(a) mu/3 (b) mu/2
(c) 2mu/3 (d) mu

Q 7. A spring of stiffness K is attached with two blocks A and B. This spring blocks system is placed on smooth ground with spring in natural length. At t= 0, an external agent starts pulling block A with constant velocity u. Impulse by spring to block B when spring regains its natural length first time is ?



(a) 0 (b) mu (c) 2mu (d) mu/2

Q 8. A force F = Sin t , is acting on a particle. Maximum impulse that the force can supply to particle is
(a) 1 unit (b) 2 unit
(c) 3 unit (d) 4 unit

Q 9. A block of mass 1 kg is projected on rough horizontal plane with initial velocity 6 m/sec. coefficient of friction is $\mu = x/3$, where x is displacement of block. Magnitude of total impulse imparted by friction on block is
(a) 3 Kg m/sec
(b) 6 Kg m/sec
(c) 12 Kg m/sec
(d) 9 Kg m/sec

Q 10. A sphere of radius 1meter and mass 1 kg is placed on smooth ground. An impulse of 20 kg m/sec is imparted on it as shown in figure. Find velocity of sphere after imparting impulse ?(sphere is not bouncing up)

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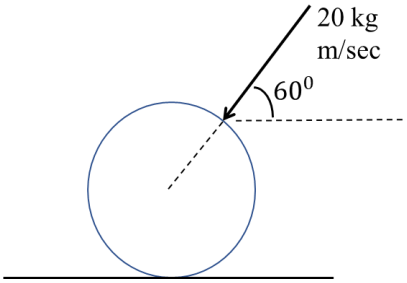
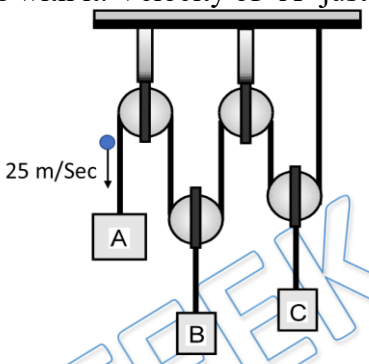


(a) 20 m/sec
(b) 10 m/sec
(c) 17 m/sec
(d) 8.5 m/sec

Q 11. In given figure 'B' and 'C' have equal mass 1 kg each and mass of 'A' is 2 kg. system was initially at rest. A ball of mass 1 kg hits 'A' with speed 25 m/sec as shown in figure and sticks with it. Velocity of 'A' just after hitting is



(a) 4 m/Sec
(b) 6 m/Sec
(c) 16 m/Sec
(d) 8 m/Sec

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Answer Key

Q.1 a	**Q.2 b**	**Q.3 b**	**Q.4 a**	**Q.5 d**
Q.6 c	**Q.7 c**	**Q.8 b**	**Q.9 b**	**Q.10 b**
Q.11 d				