14) A head on one-dimensional elastic collision occurs between two identical balls. After collision, the two balls will

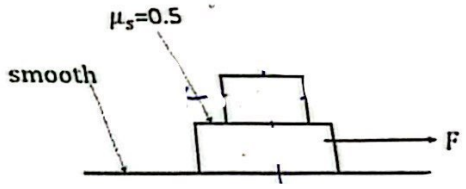
(a) Stick together and move as one body.
(b) Move in opposite direction.
(c) Move perpendicular to each other.
(d) Have equal speeds.
(e) Exchange momentum.

15) A wheel, starting from rest, is rotating with constant angular acceleration. In 8 seconds, it attains (وصلت إلى) an angular speed of 10π rad/s. during this interval, how many revolutions does the wheel make?

(a) 40 rev
(b) 10 rev
(c) 20 rev
(d) 25 rev
(e) 30 rev

20) A 3.0 kg block is placed on a second block of mass 4.0 kg. The system is initially at rest on a smooth table. If μ_s and μ_k between the two blocks are 0.5 and 0.25 respectively, the maximum horizontal force that can be applied to the lower block such that the two blocks move with the same acceleration is

(a) 10.0 N
(b) 45.0 N
(c) 40.0 N
(d) 25.0 N
(e) 35.0 N



6) Two identical cars are traveling towards each other in a straight line. One car has a speed of 40 km/h and the other has a speed of 120 km/h. The speed of their center of mass is

(a) 60 km/h
(b) 20 km/h
(c) 25 km/h
(d) 40 km/h
(e) 80 km/h

7) A vector of magnitude 7 units is added to a [illegible] 5 units. The magnitude of the resultant vect[illegible]

(a) = 4 units
(b) = 1
(c) =
(d) =
(e) = 8 units

8) The inertia of a body tends to cause the body to:

(a) speed up
(b) slow down
(c) resist any change in its state of rotational motion
(d) resist any change in its state of linear motion
(e) decelerate due to friction

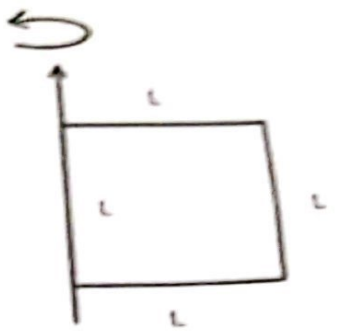
A disk of radius R rotates about a fixed axis. When a point at a distance R from the center of the disk is moving with a linear speed v_0, a point located at a distance R/3 from the center is moving with a linear speed of

(a) $v_0/2$
(b) $2\,v_0$
(c) v_0
(d) $v_0/4$
(e) $v_0/3$

A fish weighs (تزن) 10.0 N at rest. When it is weighed on a spring scale (ميزان زمبركي) in an elevator moving with constant speed upwards at 2.0 m/s, the fish weighs

(a) 8.0 N
(b) 10.0 N
(c) 12.0 N
(d) 20.0 N
(e) 16.0 N

The moment of inertia of a square made of thin rods each of length L and mass M about an axis passing along one edge and in its plane as shown in figure is given by:



(a) $(3/2)ML^2$
(b) $(5/6)ML^2$
(c) $(3/7)ML^2$
(d) $(5/3)ML^2$
(e) $(1/2)ML^2$

27) Due only to frictional forces, the velocity of a wooden block sliding across a level table decreases at the rate of 5.0 m/s^2. The coefficient of kinetic friction between the block and the table is:

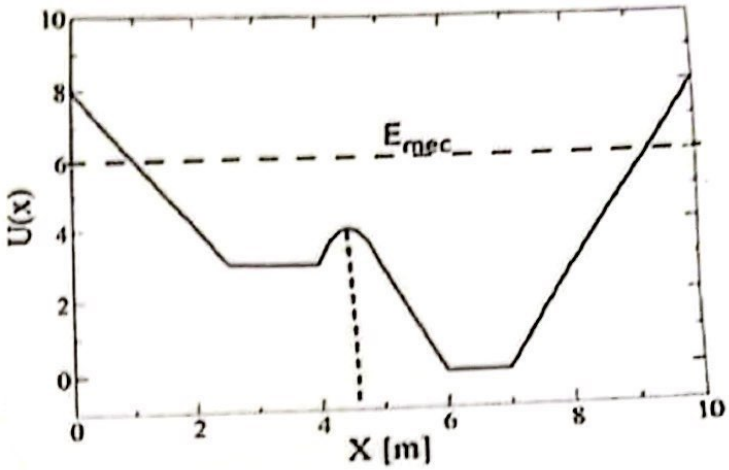
(a) 0.50
(b) 0.25
(c) 0.40
(d) 0.30
(e) 0.60

28) A train is moving at constant speed of 15 m/s due west. Rain droplets are falling at a constant rate of 15 m/s. The speed of the rain droplets (in m/s) as measured by a passenger in the train is

(a) 16
(b) 21
(c) 28
(d) 25
(e) 12

1) The adjacent graph represents the potential curve of a 2.0 kg mass with a total mechanical energy of 6.0 Joules. The speed of the mass at x=4.5 m is

(a) $2.00\ m/s$
(b) $2.45\ m/s$
(c) $1.41\ m/s$
(d) $0.00\ m/s$
(e) $1.73\ m/s$



2) A satellite is orbiting earth at an altitude of 500 km above earth surface. The radius of earth is 6400 km. If the satellite is orbiting earth with a speed of 7700 m/s, then the acceleration of gravity at the location of the satellite is

(a) $9.25\ m/s^2$
(b) $8.85\ m/s^2$
(c) $8.72\ m/s^2$
(d) $8.59\ m/s^2$
(e) $9.00\ m/s^2$

) An 100 kg man runs upstairs elevating himself a 20 m vertical distance in a time of 10 seconds. The power generated by the man in running upstairs is

(a) 1.2 kW
(b) 1.4 kW
(c) 1.6 kW
(d) 2.0 kW
(e) 1.5 kW