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Take g = 9.8 ms^{-2} where ever needed

1	Newton's law of universal gravitation is represented by $F = \frac{GMm}{r^2}$ Where F is the gravitational force exerted by one object on another (force has the SI units $kg{\cdot}m/s^2$), M and m are the masses of the objects, and r is a distance. The SI units of the proportionality constant G is: A) $m^2/kg.s^3$. B) $m^3/kg.s^2$ C) $s^2/kg.\ m^3$ D) $s^3/kg.\ m^2$ E) $kg\ /\ s^2.\ m^3$	B
2	An object has a one dimensional motion described by the equation $x = 1 + 2t + 4t^2$, where x is the position in meters and t is the time is seconds. The change in the velocity from time t_i=0 to t_f =4s is: A) 24 m/s B) 36 m/s C) 16 m/s D) 32 m/s E) 40 m/s	D
3	Two bodies A and B are dropped from heights of 9 m and 16 m, respectively. The ratio of the time taken by them, t_A / t_B, to reach the ground is: A) 3/5 B) 4/5 C) 3/4 D) 3/8 E) 5/8	C
4	Two identical balls are at rest side by side at the bottom of a hill. Sometime after ball A is kicked up the hill, ball B is given a kick up the hill to a different height. Ball A is headed downhill when it passes ball B headed up the hill. At the instant when ball A passes ball B: A) it has the same position and velocity as ball B B) it has the same position and acceleration as ball B C) it has the same velocity and acceleration as ball B D) it has the same displacement and velocity as ball B E) it has the same position, displacement and velocity as ball B	B
5	A car moving along a straight track changes its velocity from 40 m/s to 80 m/s in a distance of 200 m. the acceleration of the car during this time is: A) 9.6 m/s^2 B) 7 m/s^2 C) 12 m/s^2 D) 8 m/s^2 E) 10.7 m/s^2	C
6	Vector **A** has *x* and *y* components of –8.7 cm and 15 cm, respectively; vector **B** has *x* and *y* components of 13.2 cm and –6.6 cm, respectively. If **A** – **B** + 2**C** = 0, the components of vector **C** are: A) 5.5 **i**, -5.4 **j** B) -3.6 **i**, 5.1 **j** C) -7.3 **i**, 7.2 **j** D) 3.2 **i**, -4.1 **j** E) 10.95 **i**, -10.8 **j**	E
7	A vector starts at *x*, *y* coordinates (3, 4) and ends at *x*, *y* coordinates (−2, 16). What are the magnitude and direction of this vector? A) 13 m, 113° B) 17 m, 120° C) 13 m, 220° D) 19 m, 137° E) 19 m, 173°	A
8	A cannon ball is fired from a cannon at an angle θ to reach a maximum range of 2000 m. If this cannon ball is fired straight up, how high can it reach? A) 800 m B) 1200 m C) 1000 m D) 2000 m E) 1500 m	C

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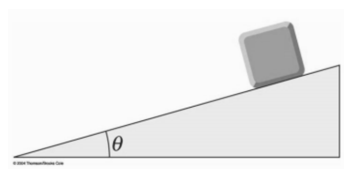
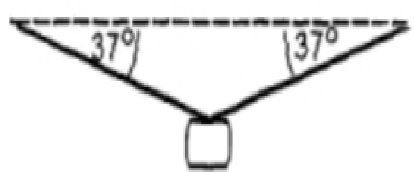
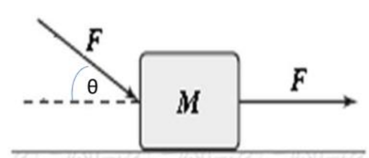
9	A particle is moving in the *xy* plane from (0,0) with an initial velocity of v = 16**i** – 12**j** m/s. If its constant acceleration is **a** = 3**i** – 6**j** m/s^2, what is its speed after 2 s? A) 39 m/s B) 45.6 m/s C) 24 m/s D) 41 m/s E) 32.6 m/s	E
10	A car has the maximum centripetal acceleration 10 m/s^2, so that the car can turn without skidding out of a curved path. If the car is moving at a constant speed of 108 km/h, what is the radius of the curve? A) 0.09 km B) 0.15 km C) 0.05 km D) 0.3 km E) 0.4 km	A
11	Two projectiles are launched at 100 m/s, the angle of elevation for the first being 30°and for the second 60°. Which of the following statements is correct? A) The projectiles do not have the same acceleration while in flight. B) Both projectiles have the same range. C) The first projectile has the lower speed at maximum altitude D) The first projectile has the lower range E) The second projectile has the lower range	**B**
12	A 5 kg block slides down a 30° incline at a constant speed when a 21 N force is applied acting up and parallel to the incline. The coefficient of kinetic friction between the block and the surface of the incline is:  A) 0.22 B) 0.08 C) 0.45 D) 0.34 E) 0.40	**B**
13	A 1300 N car, at a ski lift, is temporarily suspended at the halfway point, causing the wire to sag (يتدلى) by an angle of 37° below the horizontal. The tension in the cable is:  A) 1246 N B) 2160 N C) 1412 N D) 2490 N E) 1080 N	E
14	The horizontal surface on which the block slides is frictionless. If F = 20 N, θ=41° and M = 5 kg, the magnitude of the acceleration of the block is:  A) 7 m/s^2 B) 3 m/s^2 C) 4 m/s^2 D) 5 m/s^2 E) 8 m/s^2	A
15	The apparent weight of a fish in an elevator is smallest when the elevator. A) moves upward at constant velocity. B) moves downward at constant velocity C) accelerates downward D) accelerates upward E) is not moving	C

The end

Rough work