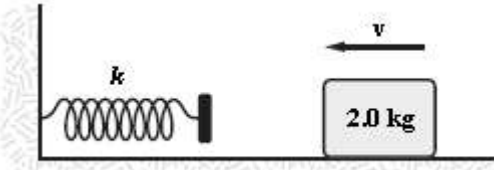
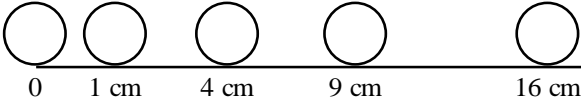
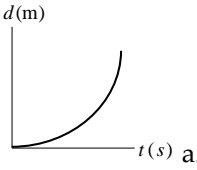
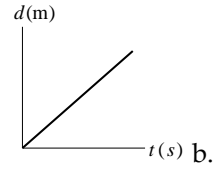


Midterm Exam

Name: Surname:.....

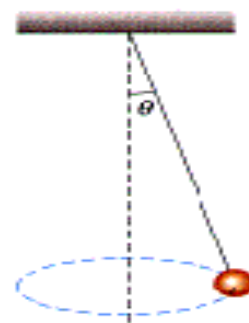
Student #:..... Course Code:.....

ANS:

1.	If $\vec{A} = 12\hat{i} - 16\hat{j}$ and $\vec{B} = -24\hat{i} + 10\hat{j}$, what is the magnitude of the vector $\vec{C} = 2\vec{A} - \vec{B}$?	a. 42 d. 90	b. 22 e. 13	c. 64	ANS: c			
2.	The horizontal surface on which the block slides is frictionless. The speed of the block before it touches the spring is 6.0 m/s. How fast is the block moving at the instant the spring has been compressed 15 cm? $k = 2.0$ kN/m				a. 5.4 m/s d. 3.7 m/s	b. 4.4 m/s e. 14 m/s	c. 4.9 m/s	ANS: d
3.	A series of photographs, taken 1 second apart by a camera fixed in space, are superposed to show the successive positions of a ball rolling horizontally. Which of the graphs describes the ball's motion correctly?				 a.  b.	ANS: a		
4.	At $t = 2.0$ s, a particle moving with constant velocity is at $x = 6.6$ m. What is its position in m at $t = 2.7$ s if it starts at the origin at $t = 0$?	a. 7.8 c. 9.0 e. 9.9	b. 8.9 d. 9.3		ANS: b			
5.	A particle's position on the x -axis is given by the equation $x = 1 + 2t - t^2$. What is its velocity in m/s at $t = 2$ s if x is measured in m and t in s?	a. -2 c. 0 e. 1	b. -1 d. 0.5		ANS: a			
6.	A hot air balloon rises with a constant speed of 5 m/s. When it is 30 m above the ground a rock is dropped from the balloon. How long in s does it take the rock to hit the ground?	a. 4 c. 5 e. 7	b. 3 d. 6		ANS: b			
7.	If $\vec{r}_0 = 0$ m, $\vec{v}_0 = 3\hat{i}$ m/s, and $\vec{a} = \hat{j}$ m/s ² , what is \vec{r} in m at $t = 2$ s?	a. $10\hat{j}$ c. $2\hat{i} + 3\hat{j}$	b. $6\hat{i} + 2\hat{j}$ d. $4\hat{i} + 6\hat{j}$	e. $3\hat{i}$	ANS: b			
8.	The equation for the change of position of a train starting at $x = 0$ m is given by $x = \frac{1}{2}at^2 + bt^3$. The dimensions of b are	a. T ⁻³ d. LT ⁻³	b. LT ⁻¹ e. L ⁻¹ T ⁻¹	c. LT ⁻²	ANS: d			
9.	Equal amounts of work are performed on two bodies, A and B, initially at rest, and of masses M and $2M$ respectively. The relation between their speeds immediately after the work has been done on them is	a. $v_A = \sqrt{2}v_B$ d. $v_B = \sqrt{2}v_A$	b. $v_A = 2v_B$ e. $v_B = 2v_A$	c. $v_A = v_B$	ANS: a			
10.	A 32 kg mass is subjected to a constant acceleration for 0.80 s while its speed changes from 3.0 m/s to 9.0 m/s. What is the force on the mass in N?	a. 96 c. 160 e. 240	b. 120 d. 190		ANS: e			

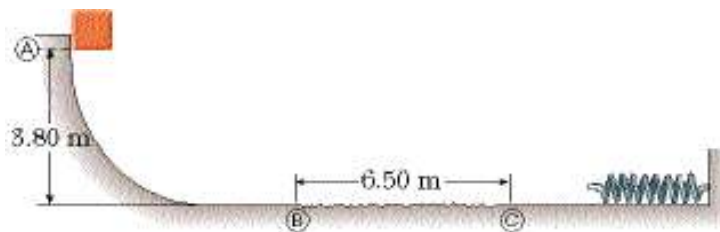
11.	A rock is projected from the edge of the top of a building with an initial velocity of 12.2 m/s at an angle of 53° above the horizontal. The rock strikes the ground a horizontal distance of 25 m from the base of the building. Assume that the ground is level and that the side of the building is vertical. How tall is the building?	a. 25.3 m b. 29.6 m c. 27.4 m d. 23.6 m e. 18.9 m	ANS: d
12.	A 1200 kg car is moving in a straight line at a constant speed of 15 m/s when the brakes are applied. The coefficient of friction between the car and the road is 0.25. How far in m does the car travel after the brakes are applied?	a. 37 c. 41 e. 46	b. 39 d. 44 ANS: e
13.	A constant force of 12 N in the positive x direction acts on a 4.0-kg object as it moves from the origin to the point $(6\hat{i} - 8\hat{j})$ m. How much work is done by the given force during this displacement?	a. +60 J d. +48 J	b. +84 J e. +57 J c. +72 J ANS: c
14.	The conservative force $F = (4.0x + 3.0)$ N does work on a particle moving along the x -axis. How much work in J is done on the particle by this force when the particle moves from $x = 2.0$ m to $x = 3.0$ m?	a. 12 c. 14 e. 13	b. 16 d. 15 ANS: : e

15. [3 points] Consider a conical pendulum with an 95.0 kg bob on a 14.0 m wire making an angle of 8.00° with the vertical. Determine the horizontal and vertical components of the force exerted by the wire on the pendulum.



$$T_h = 131 \text{ N}, T_v = 931 \text{ N}$$

16. [3 points] A 20.0 kg block is released from point A in the Figure. The track is frictionless except for the portion between B and C, which has a length of 6.50 m. The block travels down the track, hits a spring of force constant $k = 1850$ N/m, and compresses the spring 0.260 m from its equilibrium position before coming to rest momentarily. Determine the coefficient of kinetic friction between the block and the rough surface between B and C.



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