18/20

PHYSICS DEPARTMENT
SPRING SEMESTER 2011/2012

PHYSICS 105 (FIRST EXAM)
(March 20th, 2012)

Student's Name (In Arabic):.....Registration #:.....Sec#. 12 - 1

Useful Information: **Some Results Are Rounded.. CONSIDER (ACCELERATION DUE TO GRAVITY)** $\mathbf{g = 9.8\ m/s^2}$

1) The position of an object is given as a function of time as $x(t) = (3.00\ \text{m/s})t + (2.00\ \text{m/s}^2)t^2$. What is the average velocity of the object between $t = 0.00$ s and $t = 2.00$ s?

(A) 7.00 m/s B) 13.0 m/s C) 27.0 m/s D) 11.0 m/s E) 3.00 m/s

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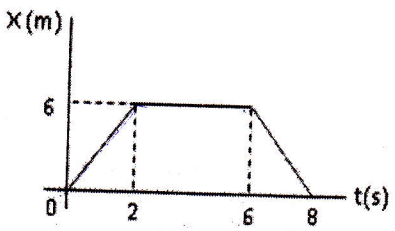
2) A car is moving along the x – axis. The variation of its displacement with time is shown in the figure below. The distance (m) traveled between t = 0 and t = 8 s is

A) 0 (B) 12 C) 6
D) 8 E) 18



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3) An object is fired with a velocity given by (in m/s): $\vec{v}_0 = 20\,\hat{i} + 10\,\hat{j}$. How high does the object reach with respect to the firing point?

$v_{oy} = 10$ m/s $(v_{fy})^2 = (v_{oy})^2 - 2g\Delta y$
$0 = 100 - 2(9.8)\Delta y$
$\Delta y = \frac{-100}{-2(9.8)}$
$\Delta y = 5.1$ m

A) 2.5 m B) 5.1 m C) 10.2 m D) 20.4 m E) 25.5 m

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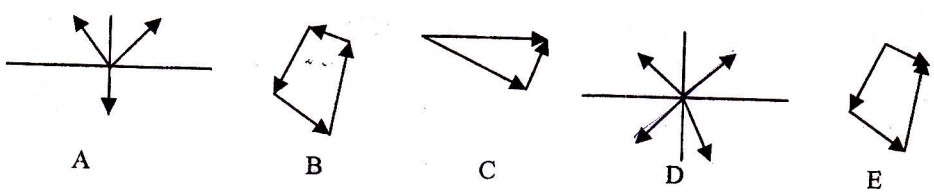
4) Each of the following diagrams represents a set of forces acting on an object. If the object moves with a constant velocity, which diagram best represents the forces acting on it?



(A) B B) C C) A D) D E) E

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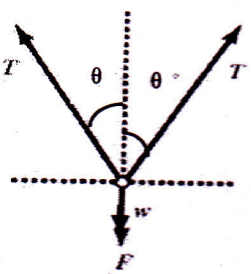
5) A 5.1-kg box is held at rest by two ropes that form θ = 30° angles with the vertical. An external force *F* acts vertically downward on the box. The force exerted by each of the two ropes is denoted by *T*. A force diagram, showing the four forces that act on the box in equilibrium, is shown below. The magnitude of force *F* is 920 N. The magnitude of force *T* is equal to:

A) 970 N B) 388 N (C) 560 N D) 486 N E) 777 N



6) A student is sitting on the right hand side in a bus, facing the direction of travel. The bus turns left while the student remains in the same position on the seat. While turning, the student experiences

A) A force to the left and a force to the right
B) A resultant force backward
C) A resultant force to the right
D) A resultant force to the left
E) Zero resultant force

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7) A football player kicks a ball on a level field with an initial velocity of 20.0 m/s at an angle 30.0° with the horizon. What is the range of the ball?

A) 81.6 m B) 40.8 m C) 17.7 m D) 70.6 m E) 35.3 m

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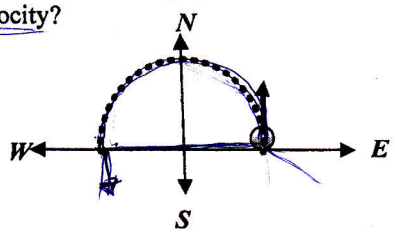
8) A car traveling around a semicircle having a radius 500 m with constant speed, as shown in figure. If the total elapsed time is 50 s, what is the magnitude and direction of the average velocity?

A) 10 m/s East
B) 20 m/s East
C) 20 m/s West
D) 10 m/s West
E) 0



$v = \frac{\pi r}{t} = \frac{\pi}{20}$ $\pi = 3.14$ πr

C

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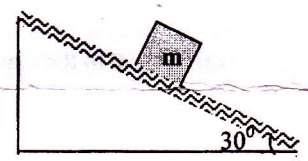
9) A 10-kg block slides down an inclined plane making an angle of 30° with the horizontal at a constant speed. The coefficient of kinetic friction between the block and the surface is

A) 0.50
B) 0.87
C) 0.42
D) 0.58
E) 1.73



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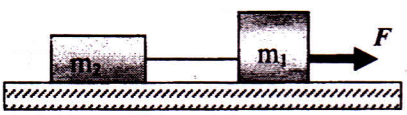
10) The figure shows two objects connected by a massless string. A force (F) of 30.0 N acts on the object with mass m_1 = 5 kg to the right. If the coefficient of kinetic friction between all surfaces is 0.2, and the system accelerates at 2 m/s^2, what is the tension in the string?

A) 10.2 N B) 30.2 N C) 29.8 N D) 49.8 N
E) The problem cannot be solved since m_2 is not known



$\mu_k = 0.2$

***List your final answers in this table using* Capital Letters**
Only the answer in this table will be graded

Question	Q1:	Q2:	Q3:	Q4:	Q5:	Q6:	Q7:	Q8:	Q9:	Q10:
Final Answer	A	B	E	A	C	D	E	C	D	A

B

9