

University of Jordan  
 Faculty of Science  
 Department of Physics

Fall Semester 2013/2014  
 Date: 3/11/2013  
 Time: 1:00-2:00

General Physics I (0302101)  
 First Exam

Name: [Redacted]  
 Number: [Redacted]  
 Instructor: [Redacted]

-Answer Sheet

List your final answer in this table. Only the answer in this table will be graded.

Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Answer	b	a	e	a	c	d	d	c	d	c

- If  $\vec{A} = 2\hat{i} - 6\hat{j} + 3\hat{k}$ , what is the angle (in degrees) the vector  $\vec{A}$  makes with the z-axis?  
 (a) 56      (b) 65      (c) 90      (d) 149      (e) 73
- A particle moving along the x axis has a position given by  $x = (24t - 2.0t^3)$  m, where  $t$  is measured in s. What is the magnitude of the acceleration (in units of  $m/s^2$ ) of the particle at the instant when its velocity is zero?  
 (a) 24      (b) zero      (c) 12      (d) 36      (e) 48
- If the only forces acting on a 2.0 kg mass are  $\vec{F}_1 = (3.0\hat{i} - 8.0\hat{j})N$  and  $\vec{F}_2 = (5.0\hat{i} + 3.0\hat{j})N$ , what is the magnitude of the acceleration (in units of  $m/s^2$ ) of the particle?  
 (a) 8.7      (b) 6.6      (c) 2.4      (d) 3.1      (e) 4.7
- If  $\vec{A} = 7\hat{i} - 6\hat{j} + 5\hat{k}$ ,  $|\vec{B}| = 7$ , and the angle between  $\vec{A}$  and  $\vec{B}$  (when the two are drawn starting from the same point) is  $60^\circ$ , what is the scalar product of these two vectors?  
 (a) 37      (b) 26      (c) 82      (d) 16      (e) 61

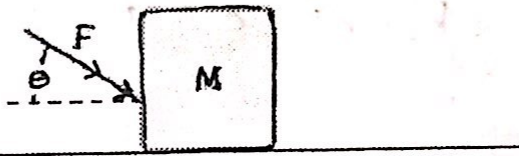
5. A particle starts from the origin at  $t = 0$  with a velocity of  $(16\hat{i} - 12\hat{j})$  m/s and moves in the  $xy$  plane with a constant acceleration of  $\vec{a} = (3.0\hat{i} - 6.0\hat{j})$  m/s<sup>2</sup>. What is the speed of the particle at  $t = 2.0$  s?

- (a) 68 m/s      (b) 22 m/s      (c) 33 m/s      (d) 48 m/s      (e) 59 m/s

6. A projectile is thrown from the top of a building with an initial velocity of 30 m/s in the horizontal direction. The top of the building is 30 m above the ground. What is the speed of the projectile just before it strikes the ground?

- (a) 31 m/s      (b) 52 m/s      (c) 83 m/s      (d) 39 m/s      (e) 26 m/s

7. A block is pushed across a horizontal surface by the force shown. If the coefficient of kinetic friction between the block and the surface is 0.30,  $F = 20$  N,  $\theta = 30^\circ$ , and  $M = 3.0$  kg, what is the magnitude of the acceleration of the block (in units of m/s<sup>2</sup>)?



- (a) 3.1      (b) 6.6      (c) 4.5      (d) 1.8      (e) 7.7

8. If  $\vec{C} = [10 \text{ m}, 30^\circ]$ , what is the Cartesian coordinates of this vector?

- (a) (2.2, 4.4) m      (b) (4.3, 2.5) m      (c) (8.7, 5.0) m  
 (d) (13, 7.5) m      (e) (1.0, 10) m

9. A car travels north at 30 m/s for 30 minutes. It then travels south at 40 m/s for 15 minutes. The total distance the car has traveled and its displacement are:

- (a) 18 km; 18 km South      (b) 36 km; 36 km South  
 (c) 36 km; 36 km North      (d) 90 km; 18 km North  
 (e) 90 km; 36 km North

10. A 80 kg block sits on a rough horizontal surface. A force of magnitude 2.0 N acting parallel to the surface is applied to the block. The coefficient of static and kinetic friction between the block and the surface are  $\mu_s = 0.40$  and  $\mu_k = 0.30$  respectively. What is the magnitude of the force of friction acting on the block?

- (a) 235 N      (b) 314 N      (c) 2.0 N      (d) 6.0 N      (e) 4.0 N