PRINCE SULTAN UNIVERSITY
جامعة الأمير سلطان

Department of Mathematics and General Sciences

Physics 1 (PHY105)
First Major Exam

First Semester, Term 131
Date: Thursday 24/10/2013

Name:	
ID number:	
Section number or time:	
Instructor's name:	

Important instructions:

1. Examination time: 60 minutes.
2. Write your name now before starting with the questions.
3. Switch off your mobile phone and put any books and notes away.
4. Check that you have 6 pages in total, including this cover page and a scratch paper.
5. You may use a calculator but you may *not* borrow one.

Good Luck!

	Mark
Part 1	
Part 2	
Total	

SCECTION I (8 Marks): Circle the letter of the correct answer. Use $\mathbf{g = 9.8\ m/s^2}$

Q. 1. Which one of the following is the basic unit in SI system

A) m/s B) m/s^2 C) m D) m^2

Q.2. Which of the following quantities is a Vector quantity.

A) Distance B) Time C) Speed D) Displacement

Q. 3. A stone is thrown straight up. When it reaches its highest point then,

A) Both its velocity and its acceleration are zero.
B) Its velocity is zero and its acceleration is not zero.
C) Its velocity is not zero and its acceleration is zero.
D) Neither its velocity nor its acceleration is zero. E) Cannot determine.

Q. 4. If a basketball is thrown from zero to 30 m/s in 0.1 s, its average acceleration is,

A) 3.0 m/s^2. B) 30 m/s^2. C) 300 m/s^2. D) 3000 m/s^2. E) none of the above

Q.5. Starting from rest, the distance a freely falling object will fall in 10 seconds is

A) 100 m. B) 490 m. C) 980 m. D) 50 m. E) 20 m.

Q.6. Consider two vectors in s as, $\vec{A} = 2\,\hat{x} - 3\hat{y}$ and $\vec{B} = 4\hat{x} + 6\hat{y}$, then $\vec{A} \cdot \vec{B}$ is equal to,

A) -15 $\hat{x}$ B) 20 $\hat{y}$ C) - 10 D) 18

Q.7. A car travels first two hours at 100 km/h then it travels for six hours at 150 km/h. The average speed of the car is

A) 110 km/h B) 137.5 km/h C) 145.5 km/h D) 250 km/h

Q.8. A car moves such that its initial velocity is (12 m/s) $\hat{x}$ and the final velocity 10 seconds later is (– 12 m/s) $\hat{y}$. What is the magnitude of cars' acceleration?

A) 1.5 m/s^2 B) 1.7 m/s^2 C) 12 m/s^2 D) 24 m/s^2

SCENTION II (12 marks): ANSWER COMPLETELY SHOWING ALL YOUR WORK. use $g = 9.8\ m/s^2$.

Q1. (3 marks)

A Sports car dealer claims that its super deluxe sports car will accelerate from rest to a speed of 175 km/h in 8 seconds, assuming car accelerates at a constant rate.

(a) Find the acceleration of the sports car.

(b) Find the distance car travels during acceleration time.

(c) What is the speed of the car after 10 seconds?

Q2 (3 marks)

A body moves in a x-y plane such as its initial position vector $\overrightarrow{r_1} = \hat{x} + \hat{y}$ changes to final position vector as $\overrightarrow{r_2} = 4\hat{x} + 9\hat{y}$. in 2 seconds. Find the velocity vector and the speed of the body.

Q.3. (3 marks)

A model rocket blasts off from rest and moves upwards with an acceleration of 12 m/s^2, until it reaches a height of 26 m, at this height its engine stops working.

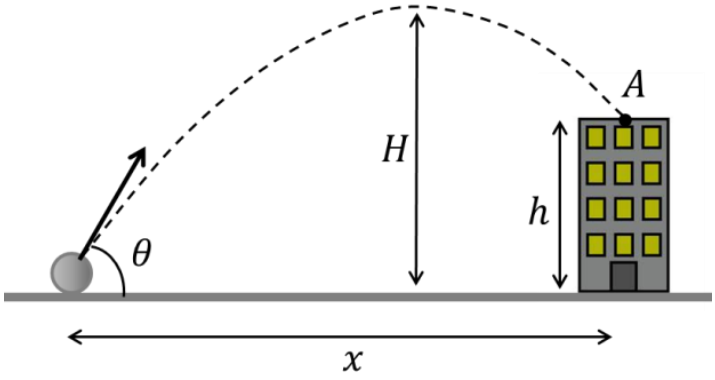
(a) What is the velocity of rocket when its engine failed?

(b) What is the maximum height attained by the rocket?

Q.4. (3 marks)

A ball is kicked from the ground towards a building of height '*h*', as shown in the figure. The initial velocity of the ball is 30 m/s at an angle of 54^{o} above the horizontal. Three seconds later, the ball strikes at point 'A' on the building.

a) What is the height '*h*' of the building?
b) What is the horizontal distance between the launching point and point 'A'.
c) What is the velocity of the ball when it strikes at point 'A' (magnitude and direction)?



Scratch Paper