Prince Sultan University

Department of Mathematics & Physics

PHY 105- General Physics 1

First Exam

First Semester, Term 171

Monday 30/Oct./2017

Examination Time : 60 minutes

Name: .....

Student I.D. .....

Circle your Section

279	282	285	654
8 – 9:15	9 – 9:50	1 – 2:15	10 – 10:50
Dr. Muaffaq Nofal	Dr. Muaffaq Nofal	Dr. Muaffaq Nofal	Dr. Hazim abu Farsakh

Use the magnitude of the acceleration of gravity = 9.8 m/s^2

Important Instructions:

1. You can use a scientific calculator that does not have programming or graphing capabilities.
*2. You may **NOT** borrow a **calculator** from anyone.*
*3. Do not use **RED pen**.*
*4. This is a closed books and notes exam. Do **NOT** use notes or textbooks.*
*5. There should be **NO** talking during the examination.*
*6. Your will be **expelled** immediately from the exam if your mobile phone is seen or heard.*
*7. Any signs of **cheating** may cause you being expelled from the exam.*
*8. This examination has **3 parts**. **Part 1** has **6 multiple choice questions**, each question worth **0.5 point**. **Part 2** has **4 multiple choice questions**, each question worth **1 point. Part3** has **two workout problems** each problem worth **4 points**.*

Make sure your paper has all the questions and problems.

Part 1: 6 Multiple Choice Questions (0.5 mark each)

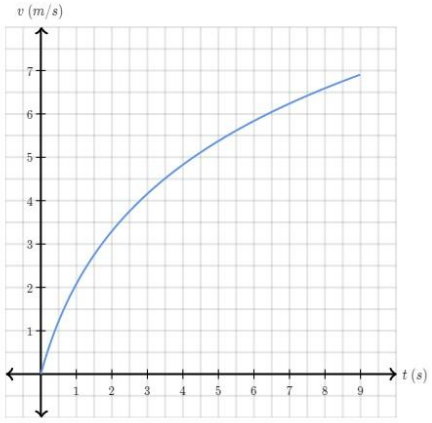
1) Using the appropriate number of significant figures, what is the result of $14.3 - 69.5684 \div 5.840$?

a) 2.0 b) 2.4 c) 2.39 d) 2.388

2) The speed, *v*, of an object measured in meters per second is given by the following equation $v = A + (B/t^2) + Ct^4$, where t refers to time in seconds. What should be the units of A, B, and C respectively?

a) m/s, m/s, m/s^2 b) m, m/s^2, m/s^3 c) m/s, m.s, m/s^5 d) m/s, m/s, m/s

3) A car is traveling along a straight line, and its motion is given by the velocity graph shown. Which of the following statements is true about the speed and acceleration of the car?



a) Its speed is increasing and its acceleration is also increasing.
b) Its speed is decreasing while its acceleration is increasing.
c) Its speed is increasing while its acceleration is decreasing.
d) Its speed is decreasing and its acceleration is also decreasing.

4) Which of the following is NOT true about freely falling objects?

a) A freely falling object is moving under the effect of the force of gravity only.
b) All freely falling objects have the same acceleration regardless of their mass.
c) The acceleration of a freely falling object is directed always downward.
d) The acceleration of a freely falling object at the top point of its path is zero.

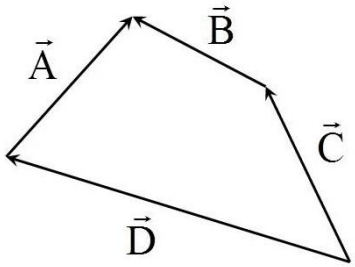
5) Which of the following is true concerning vectors $\vec{A}$, $\vec{B}$, $\vec{C}$, and $\vec{D}$ shown

a) $\vec{A}+\vec{B}=\vec{C}+\vec{D}$

b) $\vec{A}+\vec{C}=\vec{B}+\vec{D}$

c) $\vec{A}+\vec{D}=\vec{B}+\vec{C}$

d) $\vec{A}+\vec{B}+\vec{C}+\vec{D}=0$



6) If vector $\vec{A}=20\hat{x}-15\hat{y}$, then the magnitude and directional angle of $\vec{A}$ are

a) $25, 323^o$ b) $25, 143^o$ c) $13.2, 323^o$ d) $13.2, 143^o$

Part 2: 4 Multiple Choice Questions (1 mark each)

1) A car starts from rest and accelerates uniformly over a time of 6 seconds for a distance of 110 m. What is the speed of the car at the end of the 6 seconds?

a) 660 m/s b) 330 m/s c) 18.33 m/s d) 36.67 m/s

2) A particle moves in the x-y plane with a constant acceleration of $5\hat{x}-2\hat{y}$ m/s². If the velocity of the particle at a certain moment is $-8\hat{x}+13\hat{y}$ m/s, what is its velocity 4 seconds later?

a) $12\hat{x}+5\hat{y}\ \ m/s$

b) $-3\hat{x}+11\hat{y}\ \ m/s$

c) $20\hat{x}-8\hat{y}\ \ m/s$

d) $-8\hat{x}+13\hat{y}\ \ m/s$

3) A ball is thrown directly upward from a position 20 m above the ground with a velocity of 17.6 m/s. Neglecting air resistance, calculate the time needed for the ball to hit the ground.

a) 1.8 s b) 2.7 s c) 4.5 s d) 4.0 s

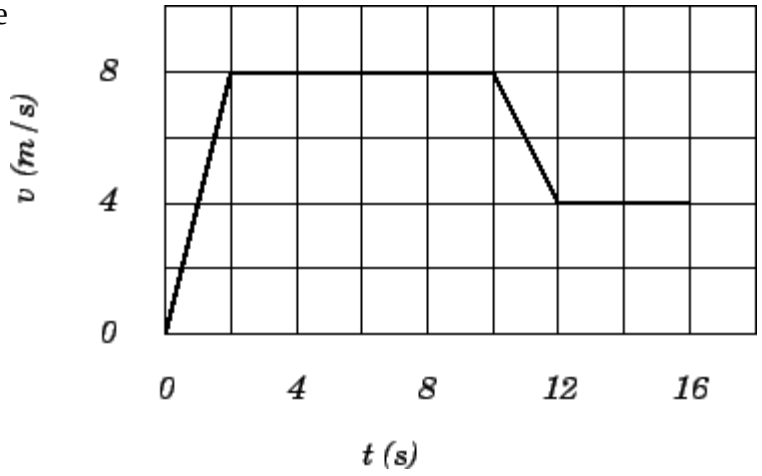
4) If $\vec{A}=7\hat{x}-11\hat{y}$ and $\vec{B}=-3\hat{x}-8\hat{y}$, then the magnitude of the vector $\vec{C}=2\vec{A}-5\vec{B}$ is

a) 56.59 b) 34.1 c) 68.4 d) 62.1

Part 3: Solve the following two problems in the space provided in between showing all your steps (4 marks each)

Problem 1: Consider the motion of an object whose velocity-time graph is given in the diagram.

a) (1 mark) During which time interval is the object moving with positive acceleration?



b) (1 mark) What is the distance traveled by object between t = 2s and t = 12s?

c) (1 mark) What is the average acceleration of the object between t = 8s and t = 16s?

d) (1 mark) What is the instantaneous acceleration of the object at t = 1 s?

Problem 2: A stone thrown horizontally from the top of a 44.1 m high building hits the ground at 120 m away from the base of the building.
a) (1 mark) How long time does it take the stone to hit the ground?

b) (1 mark) With which speed was the stone thrown?

c) (1 mark) What is the speed of the stone just before it hits the ground?

d) (1 mark) What is the angle of the impact with ground?

Scratch paper