Prince Sultan University

Deanship of Educational Services

Department of Mathematics
and General Sciences

COURSE DETAILS:

PHYSICS I	PHY105	MAJOR EXAM I
Semester:	Fall Semester --Term 191	
Date:	Tuesday, October 15, 2019	
Time Allowed:	60 minutes	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	627, 630, 639, 636
Instructor's Name:	Circle the name of your Instructor: Dr. Muaffaq Nofal, Dr. Hazem Abu-Farsakh, Dr. Asif zaidi

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 1	Page 2	Page 3	Total
Questions				
Marks	**9**	**3**	**3**	**15**

Part 1: 9 Multiple Choice Questions (1 mark each)
Use |g|=9.8 m/s^2: Please read each question carefully then please circle ◯ the correct answer.

1) The density of granite is 171 lb/ft^3 (pound per cubic feet). What is granite's density in g/cm^3? Given that (1 lb = 453.6 g) and (1 ft^3 = 28316.85 cm^3).

a) 2.2×10^9 b) 1.33×10^{-5} c) 2.74 d) 10675

2) If a is acceleration, v is velocity, x is distance, and t is time, what should be the units of A and B respectively if the equation [$Aa = v^2t + (B/x)$] is dimensionally correct?
a) (m.s), (m^3/s) b) (m.s), (s/m) c) (m/s), (m^3/s) d) (m), (s)

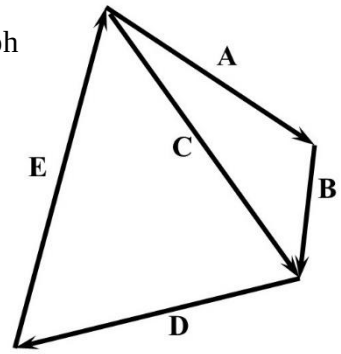
3) Which of the following is NOT true about acceleration?
a) Acceleration is a vector quantity.
b) Acceleration is measured in m/s^2.
c) Acceleration is directed always in the same direction as velocity.
d) Acceleration is the change in velocity per unit time.

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) A stone is dropped from rest from a location 60 m above ground. Assuming no air resistance, what is the height of the stone above ground at the moment when it is moving at a speed of 29 m/s?
a) 51.2 m b) 17.1 m c) 42.9 m d) 35.7 m

6) A ball is thrown from ground vertically upwards. The ball reaches a maximum height of 85.8 m above ground. Neglect air resistance and calculate with which speed was the ball thrown?
a) 41 m/s b) 32 m/s c) 24 m/s d) 12 m/s

7) Which of the following is true concerning the five vectors shown in the graph



a) **A** + **B** = **C**

b) **A** + **B** + **D** + **E** = 0

c) **C** + **D** + **E** = 0

d) all of the above

8) **A**, **B**, and **C**, are three vectors such that **C** = **A** - **B**. If vector **A** has a magnitude of 15 at a directional angle of 40° and vector **B** has a magnitude 32 at at a directional angle of 130°. What are the magnitude and directional angle of vector **C**?

a) 35.3, 155^o b) 35.3, 335^o c) 46.9, 25^o d) 17.19, 335^o

9) A particle moves in the x-y plane travels from the location (4,10) to the location (-14, 34) in 2 seconds. What are the magnitude and directional angle of the particle's average velocity?

a) 30, 53^o b) 30, 127^o c) 15, 53^o d) 15, 127^o

Part 2: Solve the following two problems in the space provided in between showing all your steps (3 marks each)

Problem 1: A typical airplane needs to reach a speed of 306 km/h before it can takeoff. If such a plane starts to move from rest, it spends 17 s on the runway.
a) What is the acceleration of the airplane?

b) How far does the airplane travel on the runway before takeoff?

c) What is the speed of the airplane after travelling 250 meters?

Problem 2: A projectile thrown from ground at angle θ above horizontal hits the ground again at the same level after 6 seconds at a location that is 168 meters away horizontally.

a) What are the horizontal and vertical component of the projectile's velocity when it was thrown?

b) What is the launch angle θ?

c) What is the maximum height reached by the projectile?

Scratch paper