

Student Name: PRINT

Last Name: Solution First Name \_\_\_\_\_

ID# \_\_\_\_\_ Signature \_\_\_\_\_

Recitation Section #/TA Name: \_\_\_\_\_

(Colin, Courtney, Jeremy, Michael, Peiyao, Tenzin)

- You are allowed a calculator and ONE 8.5"x11" sheet of paper with whatever you wish written on it (both sides).
- You must show ALL your work to receive full credit for regular problems. Numerical answers must have the right units.
- Use the back of the problem page if you need more space and mark OVER on the front to indicate that there is material on the back side.
- For the multiple-choice questions, clearly circle the letter of your choice and clearly write the letter of your choice on the front page. No points will be if two or more choices are circled

**Answers to Multiple Choice Questions:** (Please write the answers clearly here)

1. D	2. C	3. A	4. A	5. <del>A</del> C	6. C
7. B	8. B	9. A	10. B	11. B	12. B

*Please note that giving or receiving aid on an exam or any act of academic dishonesty is cause for dismissal from the University.*

<u>Question</u>	<u>Score</u>	<u>Grader</u>
1 - 12	_____	_____
13	_____	_____
14	_____	_____
15	_____	_____
16	_____	_____
<u>TOTAL</u>	_____	_____

**USEFUL CONSTANTS:**Acceleration due to gravity:  $g = 9.8 \text{ m/s}^2$

**Multiple Choice Questions**

You do not need to show your work. Please write down the answer on the front page.  
No partial credit will be given. (3 points each)

- 1) The time  $t$  required for an object to fall from rest through a height  $h$  is given by the following equation:

$$t = h^p \sqrt{\frac{2}{g}}$$

In this expression,  $g$  is the acceleration due to gravity. Find the power  $p$  that makes this equation dimensionally consistent.

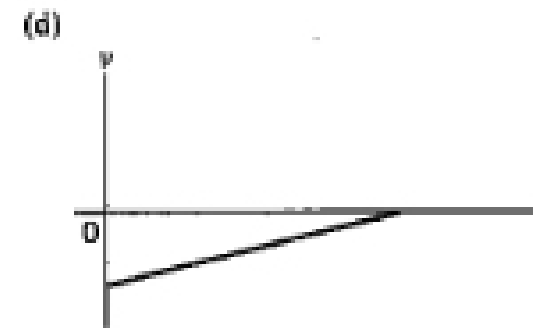
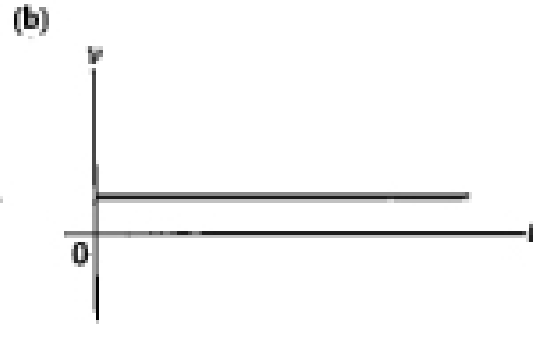
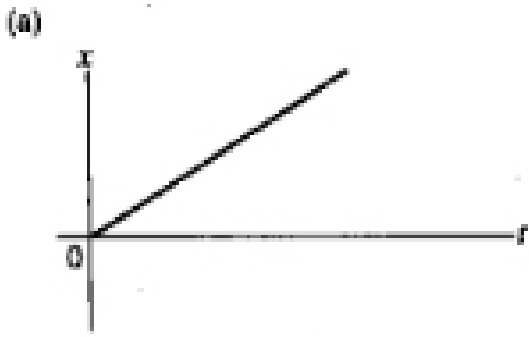
- (A)  $p = 3/4$       (B)  $p = 2/5$       (C)  $p = 1$       (D)  $p = 1/2$
- 2) An area of  $1.00 \times 10^2 \text{ cm}^2$  is how many square meters?
- (A)  $1.00 \text{ m}^2$       (B)  $1.00 \times 10^2 \text{ m}^2$       (C)  $1.00 \times 10^{-2} \text{ m}^2$       (D)  $1.00 \times 10^4 \text{ m}^2$
- 3) Suppose that a car traveling to the west begins to slow down as it approaches a traffic light. Which of the following statements about its acceleration is correct?
- (A) The acceleration is toward the east.  
(B) Since the car is slowing down, its acceleration must be negative.  
(C) The acceleration is zero.  
(D) The acceleration is toward the west.
- 4) A racing car accelerates uniformly from rest along a straight track. This track has markers spaced at equal distances along it from the start, as shown in the figure. The car reaches a speed of 140 km/h as it passes marker 3.



Where on the track was the car when it was traveling at half this speed, that is at 70 km/h?

- (A) before marker 1  
(B) between markers 1 and 2  
(C) at marker 2  
(D) between markers 2 and 3

5) Which of the following graphs represent an object having zero acceleration?



(A) only graph a

(B) only graph b

(C) graphs a and b

(D) graphs b and d

6) Consider two vectors  $\vec{A}$  and  $\vec{B}$  shown in the figure. The difference  $\vec{A} - \vec{B}$  is best illustrated by



(A) choice (a).

(B) choice (b).

(C) choice (c).

(D) choice (d).

7) A high-speed dart is shot from ground level with a speed of 150 m/s at an angle  $30^\circ$  above the horizontal. What is the vertical component of its velocity after 4.0 s if air resistance is neglected?

(A) 150 m/s

(B) 36 m/s

(C) 130 m/s

(D) 75 m/s

8) A player kicks a soccer ball in a high arc toward the opponent's goal. At the highest point in its trajectory

(A) both the velocity and the acceleration of the soccer ball are zero.

(B) neither the ball's velocity nor its acceleration are zero.

(C) the ball's acceleration is zero but its velocity is not zero.

(D) the ball's acceleration points upward.