

COURSE DETAILS:

Introduction to Physical Science		SCI101	MAJOR EXAM I
Semester:	First Semester -- Term 181		
Date:	Saturday October 13, 2018		
Time Allowed:	60 minutes		

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	
Instructor's Name:	

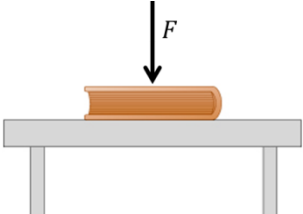
INSTRUCTIONS:

- 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 when required 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. Assume $g = 10 \text{ m/s}^2$

GRADING:

	Part 1	Part 2 - Q1	Part 2 - Q2			Total
Mark						
Full Mark	12	4	4			20

Part 1 (12 marks): Indicate the answer choice that best completes the statement or answers the question

- Q1. Which of the following is a scalar quantity?
a) weight b) speed c) momentum d) impulse
- Q2. When you jump on a trampoline straight up you land on the same position. This is because:
a) Earth does not move, otherwise the ground will be swept away
b) Earth moves very slowly
c) your body continues to move with Earth because of its inertia
d) the Earth's atmosphere keeps you moving with it
- Q3. Your mass on planet Mars
a) is the same as your mass on Earth
b) is less than your mass on Earth
c) is greater than your mass on Earth
d) depends on the force of gravity on the Mars
- Q4. Consider a car moving at constant speed in a straight line. Then, the **net** force acting on the car:
a) is zero
b) is in the same direction as the direction of motion of the car
c) is opposite to the direction of motion of the car
d) neither of the above; it depends on the speed of the car
- Q5. A 400 grams book on a table is pushed down by a force of $F = 2 \text{ N}$, as shown. The normal (support) force acting on the book is equal to:
a) 4 N b) 2 N c) 6 N d) 2.4 N
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- The diagram shows a grey rectangular table with two legs. On top of the table is a brown rectangular book. A black arrow labeled 'F' points vertically downwards from the center of the book, representing a force pushing down on it.
- Q6. A car is moving at 126 km/h. What is its speed in m/s?
a) 25 m/s b) 35 m/s c) 30 m/s d) 20 m/s
- Q7. You drive 20 km in 10 minutes and then 30 km in 20 minutes. Your average speed in this trip is
a) 50 km/h b) 100 km/h c) 40 km/h d) 166 km/h
- Q8. A ball is thrown straight upward at 20 m/s. Neglecting air resistance, how long it takes the ball to reach the maximum height?
a) 3 seconds b) 4 seconds c) 1 second d) 2 seconds
- Q9. A stone falls off the edge of a cliff and reaches the ground below after 5 seconds. Neglecting air resistance, what is the height of the cliff from the ground?
a) 25 m b) 45 m c) 80 m d) 125 m
- Q10. A small car hits a large truck initially at rest. Compared to the force on the car, the force on the truck is
a) larger b) smaller c) equal d) almost zero
- Q11. A 3 kg bowling ball moving to the right at 5 m/s slows down to 1 m/s. How much impulse affected the ball during this period of time?
a) 18 N.s to the right b) 18 N.s to the left c) 12 N.s to the right d) 12 N.s to the left
- Q12. A ball has a momentum of 30 N.s. What is the momentum of another ball which has twice the mass and one-third the velocity of the first ball?
a) 20 N.s b) 10 N.s c) 30 N.s d) 60 N.s

Part 2 (8 marks): Solve the following TWO questions in the provided space and show your solution.

- Q1. Two students push a box weighing 1250 N horizontally by applying 15 N and 18 N forces in the same directions. If the force of friction between the box and the floor is 8 N and the box was initially at rest, determine:
- a) The mass of the box

b) The net force acting on the box in the horizontal direction

c) The acceleration of the box

d) The velocity of the box after 7 seconds.

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