Prince Sultan University

Deanship of Educational Services

Department of Mathematics
and General Sciences

COURSE DETAILS:

Introduction to Physical Science	**SCI101**	**MAJOR EXAM I**
Semester:	Second Semester -- Term 182	
Date:	Sunday February 17, 2019	
Time Allowed:	60 minutes	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	Circle the number of your section: 165 166 167 168
Instructor's Name:	Circle the name of your Instructor: Dr. Muaffaq Nofal, Dr. Hazem Abu-Farsakh

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 $g = 10$ m/s^2**

GRADING:

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Mark					
Full Mark	**7**	**5**	**4**	**4**	**20**

Part 1: 12 Multiple Choice Questions (1 mark each)

1) Which of the following sets consists of only scalar quantities?

a) Mass, force, speed.

b) Speed, time, mass.

c) Weight, time, speed.

d) Velocity, force, weight.

2) The acceleration of an object is always in the same direction of

a) Its displacement b) Its velocity
c) The net force acting on it d) All of the above

3) When you apply the brakes while driving your car, what causes your body to be pushed forward?

a) Your inertia. b) Normal force due to your contact with seat
c) Gravity d) Force due to friction between you and seat

4) When a bullet is fired from a gun, the force the bullet exerts on the gun

a) is smaller than the force the gun exerts on the bullet.
b) is larger than the force the gun exerts on the bullet.
c) is in opposite direction to the force the gun exerts on the bullet.
d) is in the same direction as the force the gun exerts on the bullet.

5) The physical quantity, which is equal to the change in momentum, is

a) force b) velocity c) acceleration d) impulse

6) The momentum of an object at a given instant does not depend on its:

a) mass b) acceleration c) speed d) direction of motion

7) When you jump from an elevated position you usually bend your knees upon reaching the ground. This reduces the force of impact on you because:

a) the time of stopping is increased

b) the time of stopping is reduced

c) the impulse is increased

d) the impulse is reduced

8) A man runs at a speed of 8 m/s for a distance of 120 m then he runs at a speed of 6 m/s for 35 seconds. What is his overall average speed?

a) 6.6 m/s b) 7 m/s c) 7.6 m/s d) 8 m/s

9) A car is moving at 150 km/h to the west and a truck is moving at 70 km/h to the west along the same line. What is the velocity of the truck with respect to the car?

a) 80 km/h west b) 80 km/h east c)220 km/h west d) 220 km/h east

10) An airplane accelerates uniformly from rest to a speed of 50 m/s in 8 s. How fast is it going after 5 s of starting motion?

a) 18.75 m/s b) 25 m/s c) 31.25 m/s d) 37.5 m/s

11) A 0.15 kg ball travelling at 25 m/s strikes a wall and bounces back in the opposite direction at 15 m/s. If the average force exerted by the wall on the ball is 200 N, what was the time of contact between the wall and the ball?

a) 50 s b) 0.02 s c) 33.33 s d) 0.03 s

12) An object moving at 64 m/s undergoes a head on collision with anther object of the same mass initially at rest. If the two objects stuck together after the collision, what will be the speed of the combined object.

a) 23 m/s b) 46 m/s c) 32 m/s d) 64 m/s

Part 2: Solve the following two problems in the space provided in between showing all your steps (4 marks each)

Problem 1: A 6 kg block started to move from rest under the effect of the three forces shown in the figure?

a) (1 mark) What is the net force acting on the block?

b) (1 mark) What is the acceleration of the block?

c) (1 mark) Calculate the time needed for the block to reach a speed of 28 m/s.

d) (1 mark) What additional force (magnitude and direction) is needed to keep the object moving at constant velocity after reaching the speed of 28 m/s?

Problem 2: A 2 kg block is dropped from rest from a height of 125 m above ground. Neglect air resistance and calculate the following:

a) (1 mark) Calculate the speed of the block 1.5 seconds after being dropped.

b) (1 mark) How long does it take the block to hit the ground after being dropped?

c) (1 mark) Calculate the net force on the block when it is half way to the ground.

d) (1 mark) Calculate the distance travelled by the block between the third and fifth seconds.

Scratch paper