Prince Sultan University

Department of Mathematics & Physics

SCI 101- General Sciences

First Exam

Second Semester, Term 162

Monday 19/March/2017

Examination Time : 60 minutes

Name …….

Student I.D. …….

Circle your Section

451	452	453
10 – 10:50	11 – 11:50	1 – 2:15
Dr. Muaffaq Nofal	Dr. Muaffaq Nofal	Dr. Asif Zaidi

Use g = 10 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 **2 parts**. **Part 1** has **12 multiple choice questions**, each question worth **1 point**. **Part 2** has **two workout problems** each problem worth **4 points**.*

Make sure your paper has all the questions and problems.

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

1) Which of the following is a vector quantity?

a) Mass b) Weight c) Speed d) Time

2) For an object in dynamic equilibrium, which of the following is correct?

a) The object must be at rest.

b) The object must be moving on a frictionless surface.

c) The object's acceleration must be zero.

d) The object must be moving in outer space where no gravity exists.

3) The acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass. This statement is

a) Sometimes true b) Always true. c) Always false d) Sometimes false.

4) The driver of a car is pushed forward when the brakes of the car are applied. What law applies here?

a) Newton's first law. b) Newton's second law.

c) Newton's third law. d) None.

5) If you triple the mass of a moving object, what happens to its momentum?

a) The momentum triples.

b) The momentum stays the same.

c) The momentum is cut into one third.

d) Not enough information is given to answer this question.

6) Consider two objects A and B. Object A is a 4 kg iron block and Object B is an 8 kg iron block. Which of the following is true?
a) Object A has the same inertia as object B.
b) Object A has twice as much inertia as object B.
c) Object B has twice as much inertia as object A.
d) Object A has twice as much weight as object B.

7) A rope is pulled from both sides by two students. Every student pulls with a force of 150 N. What is the tension in the rope?

a) 0 N b) 300 N c) 150 N d) 600 N

8) If you drive your car at a speed of 80 km/h for 24 minutes then you drive at a speed of 120 km/h for 30 km, what is your overall average speed?

a) 82 km/h b) 105 km/h c) 100 km/h d) 95.4 km/h

9) A car is slowing down at a rate of 4 m/s^2. How long does it take the car to slow down from a speed of 70 m/s to 22 m/s?

a) 12 s b) 24 s c) 6 s d) 3 s

10) A horse is running at 17 km/h to the west and a cat is running at 13 km/h to the east. What is the velocity of the horse with respect to the cat?

a) 30 km/h west b) 30 km/h east c) 4 km/h west d) 4 km/h east

11) A stone is thrown from ground directly upward and caught again by the thrower 20 seconds later. What is the maximum height reached by the stone?

a) 20 m b) 100 m c) 2000 m d) 500 m

12) A ball is dropped from rest from the top of a 61.25 m high building. What will be the speed of the ball just before it hits the ground?

a) 6125 m/s b) 35 m/s c) 70 m/s d) 17.5 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 sports car weighing 8000 N is pushed by its engine with a force of 4500 N in the forward direction. The opposing force of friction acting on the car is 900 N while the opposing force of air resistance acting on the car is 400 N. Calculate:

a) (1 point) The mass of the car.

b) (1 point) The net force acting on the car.

c) (1 point) The acceleration of the car.

d) (1 point) If the speed of the car at a certain moment is 13 m/s, what will be its speed 7 seconds later?

Problem 2: A 0.3 kg ball was moving initially at a speed of 72 km/h before it hits a wall and bounces back. The ball remains in contact with the wall for a time of 0.05 s during which the wall acts with an average force of 210 N on the ball. Calculate

a) (1 point) The initial speed of the ball in m/s.

b) (1 point) The initial momentum of the ball.

c) (1 point) The impulse delivered to the ball.

d) (1 point) The speed with which the ball bounces back from the wall.

Scratch paper