Prince Sultan University

Department of Mathematics & Physics

SCI 101- General Sciences

First Exam

First Semester, Term 151

Sunday 11/10/2015

Examination Time : 60 minutes

Name …….

Student I.D. …….

Section: …….

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) What is the average speed of a car that travels a distance of 60 km in 30 min?

a) 120 km/h. b) 2 km/h. c) 1800 km/h. d) 0.5 km/h.

2) What does the speedometer of your car measure?

a) The average speed.

b) The average velocity.

c) The instantaneous speed.

d) The instantaneous velocity.

3) A train is moving at a speed of 85 km/h to the west and a dog is running at a speed of 30 km/h to the east. Assuming that the train and the dog are moving along the same straight line, what is the speed of train with respect to the dog?

a) 30 km/h b) 85 km/h c) 55 km/h d) 115 km/h

4) A 2kg object is moving horizontally with a speed of 4 m/s. How much net force is required to keep the object moving at this speed in the same direction?

a) 0 N b) 2 N c) 8 N d) 4 N

5) An object weighs 70 N on Earth. A second object weighs 70 N on the Moon. Which one has greater mass?

a) The one on Earth b) The one on the Moon

c) They have the same mass d) not enough information to decide

6) Which of the following objects has zero acceleration?

a) A tree at rest.
b) A car moving at 25m/s along a straight line.
c) An airplane in mechanical equilibrium.
d) All of the above.

7) If a car increases its velocity from 10 m/s to 70 m/s in 12 s. its acceleration is

a) 60 m/s^2 b) 5 m/s^2 c) 10 m/s^2 d) 720 m/s^2

8) The driver of a car is pushed forward when the brakes are applied. This best demonstrates that

a) There is an action-reaction pair of forces. b) The driver has inertia.

c) The driver has no acceleration. d) None of these.

9) A falling skydiver that has reached his terminal velocity encounters air resistance that equals

a) Zero b) his mass c) his weight d) 10 m/s^2

10) "*Every object continues in a state of rest or uniform speed in a straight line unless acted upon by a nonzero force*". This statement is called

a) Newton's first law. b) Newton's second law.
c) Newton's third law. d) Action-reaction law.

11) What happens when two cars with different masses have a head-to-head collision?
a) The car with smaller mass experience a greater force of impact.
b) The car with larger mass experience a greater force of impact.
c) Both cars experience the same force of impact.
d) Both cars undergo the same acceleration.

12) Which of the following is NOT true about forces?

a) Forces occur in pairs.
b) Forces are measured in Newton.
c) Forces are vectors.
d) Forces are always in the direction of velocity.

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

Problem 1: A 2.3 kg stone is thrown from ground directly upward. The maximum height reached by the stone is 45 m. Neglecting air resistance, answer the following

a) With which initial speed was the stone thrown?

b) What is the flight time of the stone until it hits the ground again?

c) What is the acceleration of the stone at the top point?

d) What is the net force acting on the stone during its free fall?

Problem 2: A car of mass 1200 kg moving at 90 km/h stops in 2 seconds when the brakes are applied

a) What is the initial speed of the car in m/s?

b) What is the acceleration of the car?

c) How much distance is covered by the car before stopping?

d) How much stopping force is applied on the car?

Scratch paper