



Prince Sultan University
Department of Mathematics & Physics
SCI 101- General Sciences
First Exam
Second Semester, Term 142
Tuesday 3/3/2015
Examination Time : 60 minutes

Name

Student I.D.

Section:

Use $g = 10 \text{ m/s}^2$

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 sets consists of only scalar quantities?
- a) Mass, force, speed.
 - b) Weight, time, speed.
 - c) Speed, time, mass.
 - d) Velocity, force, weight.
- 2) If two cars are both moving at 90 km/h but one of them is moving to the west and the other is moving to the north, then?
- a) The two cars have the same speed and the same velocity.
 - b) The two cars have different speeds and different velocities.
 - c) The two cars have the same speed but different velocities.
 - d) The two cars have the same velocity but different speeds.
- 3) When two objects are moving towards each other along the same straight line, then the relative speed of each of them with respect to the other is
- a) Smaller than the speed of each of them.
 - b) Larger than the speed of each of them.
 - c) Equals the speed of the faster object.
 - d) Equals the speed of the slower object.
- 4) The resistance of an object to any change in its motion is called its:
- a) Velocity.
 - b) Inertia.
 - c) Acceleration.
 - d) Air resistance.
- 5) If the net force on an object is zero, then the object
- a) Must be at rest.
 - b) Must be moving with constant velocity.
 - c) Is at rest or moving with constant velocity.
 - d) Is accelerating.

6) Which of the following is **NOT** true about acceleration?

- a) Acceleration is a vector quantity.
- b) Acceleration is measured in m/s^2 .
- c) The acceleration of an object is directly proportional to the net force on it and inversely proportional to its mass.
- d) Acceleration is the change in speed per unit time.

7) A car decelerates at a rate of 4 m/s^2 . If its speed at a certain moment is 50 m/s , what will be its new speed after travelling 200 m ?

- a) 30 m/s
- b) 64 m/s
- c) 1650 m/s
- d) zero

8) A stone is dropped from rest from a large height. If air resistance is neglected, what is the distance traveled by the stone in the fifth second?

- a) 45 m
- b) 90 m
- c) 50 m
- d) 125 m

9) A falling skydiver encounters air resistance equal to $\frac{2}{5}$ his weight at a certain point. What is his acceleration at this point?

- a) 6 m/s^2
- b) 4 m/s^2
- c) 10 m/s^2
- d) 2 m/s^2

10) In a tug-of-war between two students, each pulls on the rope with a force of 180 N . What is the tension in the rope?

- a) 90 N
- b) 180 N
- c) 360 N
- d) zero

11) 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 opposite to the force the gun exerts on the bullet.
- d) is in the same direction as the force the gun exerts on the bullet.

12) A 90 kg father and his 30 kg son play tug-of-war with a 20 meter long rope on frictionless ice. After a brief time, they meet. The son slides a distance of

- a) 20 m
- b) 5 m
- c) 10 m
- d) 15 m

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

Problem 1: A 9 kg block started to move from rest under the effect of the three forces shown in the figure?



- a) What is the net force acting on the block?
- b) What is the acceleration of the block?
- d) What is the distance travelled by the block in the first 7 seconds of its motion?

Problem 2: A train is accelerated from a speed of 36 km/h to a speed of 90 km/h in a time of 2 minutes.

- a) What is the acceleration of the train?
- b) If it continues to accelerate at the same rate, how much extra time is needed to reach a speed of 108 km/h?