Prince Sultan University

Department of Mathematics & Physics

SCI 101- General Sciences

Second Exam

First Semester, Term 151

Sunday 15/11/2015

Examination Time : 60 minutes

Name …….

Student I.D. …….

Instructors Name:…… …

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) When an object is lowered at constant velocity by a student then,

a) The work done by gravity is positive.

b) The work done by the student is negative.

c) The force of the student is directed upward.

d) All of the above.

2) How much energy is generated from a 70 watt heater in 4 minutes?

a) 16800 J b) 280 J c) 17.5 J d) 0.29 J

3) The engine of a car exerts a force of 1200 N to maintain a speed of 40 m/s. What is the power of the engine (Given 1 horsepower= 746 watt)?

a) 35808000 hp b) 22380 hp c) 64.3 hp d) 4800 hp

4) What is the mechanical energy of a 50 kg woman running at 7 m/s at the top of a 15 m high building?

a) 8725 J b) 1225 J c) 7500 J d) 6275 J

5) A 3 kg ball is thrown directly upward from earth surface at a speed of 20 m/s. Neglecting air resistance, calculate the gravitational potential energy of the ball at the top point.

a) 30 J b) 600 J c) 1200 J d) 60 J

6) If air resistance is neglected then, the sum of potential and kinetic energies of a freely falling body

a) increases b) decreases c) becomes zero d) remains the same

7) Which of the following is true about density?

a) Density is the force per unit area.
b) The density of an object can be negative.
c) The density of 2 kg of iron is equivalent to the density of 7 kg of iron.
d) A possible unit for density is cm^3/g.

8) At what depth under sea water is the liquid pressure 108 kPa given that the density of sea water is 1.2 g/cm^3?

a) 900 m b) 0.009 m c) 9 m d) 90 m

9) The apparent loss in weight of submerged objects is called

a) Pressure. b) Buoyancy. c) Density. d) Barometer.

10) The area of the small piston of the hydraulic jack 3 cm^2 and the area of the large piston is 16 cm^2. If a 15 N force is applied to the small piston, what is the force exerted by the large piston?

a) 2.8 N b) 0.0625 N c) 40 N d) 80 N

11) If a barometer is moved from sea level to the top of a high mountain what happens to the length of the mercury column?

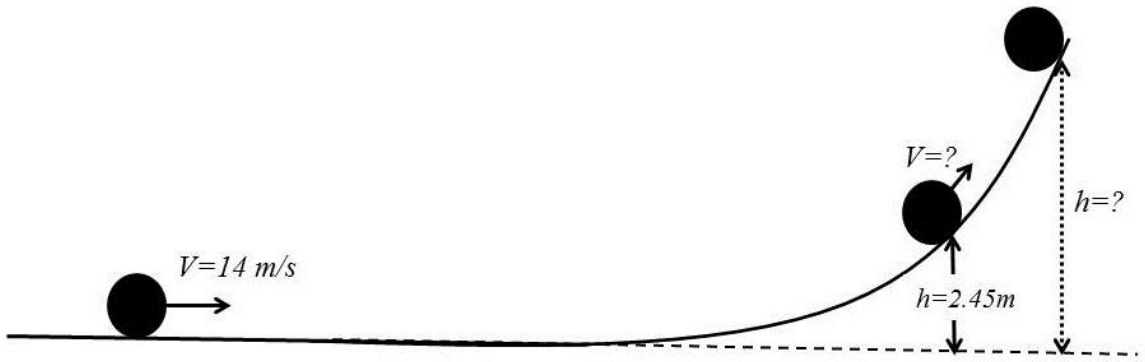
a) Becomes shorter. b) Becomes longer.
c) Remains the same. d) Anything is possible.

12) The pressure of a gas inside a closed container depends on

a) Its volume.
b) Its temperature.
c) Its density.
d) all of the above.

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 ball is rolling to the right with a speed of 14 m/s on the frictionless surface shown



a) Calculate the speed of the ball when it is 2.45 m high?

b) Calculate the maximum height reached by the ball

Problem 2: An object weighing 24 N in air and weighing 15.2 N when submerged in sea water of density 1.1 g/cm^3.

a) What is the buoyant force acting on the object?

d) What is the weight of the displaced water by the object?

b) What is the volume of the displaced water by the object?

c) What is the density of the object?

Scratch paper