Prince Sultan University

Department of Mathematics & Physics

SCI 101- General Sciences

Second Exam

First Semester, Term 141

Sunday 30/11/2014

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) Which of the following quantities is measured in joule?

a) Work.

b) Kinetic energy.

c) Potential energy

d) All of the above.

2) What is your power when you lift a 25 kg box to a height of 1.5 m at a constant speed in 3 seconds?

a) 375 Watt b) 37.5 Watt c) 125 Watt d) 12.5 Watt

3) If the kinetic energy of an object is decreased, then the net work done on the object is

a) Positive.

b) Negative.

c) Zero.

d) Anything is possible.

4) An object that has kinetic energy must be

a) Moving.

b) At ground.

c) At a high location.

d) At rest.

5) What is the speed of a 20 kg bicycle moving with 360J of kinetic energy?

a) 36 m/s b) 3 m/s c) 18 m/s d) 6 m/s

6) When 720 J of energy are put into a machine that is 85% efficient. What is the amount of useful output energy produced?

a) 720 J b) 847 J c) 1.18 J d) 612 J

7) Which of the following is **NOT** true concerning buoyancy in liquids?

a) Buoyancy exists because the pressure against the bottom of the object is greater than the top.

b) The buoyant force on a certain object equals the weight of the fluid it displaces

c) The weight of the object in air equals its weight in the liquid reduced by the buoyant force.

d) A floating object is buoyed by a force that is equal to its own weight.

8) "**How much mass occupies a given space**" is the definition of

a) Density b) Buoyancy c) Volume d) Pressure

9) "**Where the speed of the fluid increases, internal pressure in the fluid decreases"** This is the statement of

a) Boyle's Law b) Bernoulli's principle
c) Pascal's Principle d) Archimedes' Principle

10) The area of the small piston of a hydraulic jack is 40 cm^2. When a 200 N force is applied to the small piston, the force exerted by the large piston is 9000 N. What is the area of the large piston?

a) 45000 cm^2 b) 1800 cm^2 c) 0.89 cm^2 d) 1.125 cm^2

11) What is the volume on a 0.2 kg block made of a material of density 0.8 g/cm^3?

a) 0.25 cm^3 b) 160 cm^3 c) 250 cm^3 d) 4 cm^3

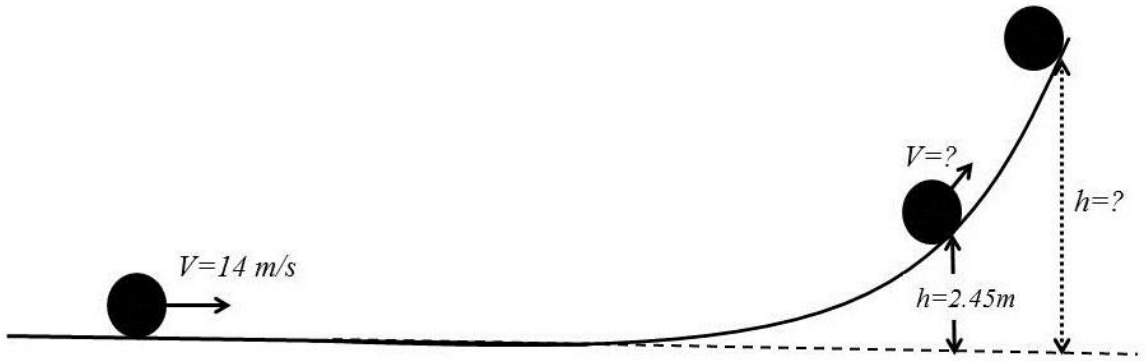
12) A gas has a volume of 5 m^3 when its pressure is 40 kPa. What will be its new pressure if it is expanded to 80 m^3?

a) 640 kPa b) 10 kPa c) 2.5 kPa d) 0.4 kPa

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

Problem 1: A solid aluminum block weighs 81 N in air. Calculate its apparent weight when it is completely immersed in Benzene.
(Given that the density of aluminum is 2.7 g/cm^3 and the density of Benzene is 0.9 g/cm^3)

Problem 2: A 1.4 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