Prince Sultan University

Department of Science & Mathematics

SCI 101- General Sciences

Second Major test

Term 171. Sunday Dec. 10, 2017

Examination Time : 1 hour

Name .....

Student I.D. .....

Section /class time: .....

Instructors. Dr. Asif Zaidi. ----------Dr. Hazim A.

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 8 **multiple choice questions**, each question worth **1 point**. **Part 2** has **three workout problems** 12 **points**.*

Make sure your paper has all the questions and problems.

Part 1: 8 Multiple Choice Questions (1 mark each)

Q1.

The statement "*Energy can neither be created nor it can be destroyed, it changes its form only.*" *is known as:*

a) Law of conservation of momentum.
b) Law of conservation of Energy.
c) Work-Energy theorem
d) None of these.

Q 2.

Which of the following quantities is a vector quantity?

a) Energy
b) Momentum
c) Work
d) Power

Q 3.

The statement "*where the speed of the fluid increases, internal pressure in the fluid decreases.*" *is known as:*

a) Bernoulli's principle
b) Pascal's principle
c) Archimedes' principle
d) None of these

Q 4.

A 50 g ball is thrown straight upwards with initial speed of 20 m/s. What is ball's maximum potential energy? (Neglect Air Friction)

a) 10 J.
b) 20 J.
c) 30 J.
d) 35 J.

Q 5.

If the distance between two masses is doubled, gravitational force of attraction among masses will:

a) Double
b) Remain the same
c) Reduce by one half
d) Reduce by one quarter

Q6.

How much power is required to increase the kinetic energy of an object from 360 J to 1800 J in 2 minutes?

a) 4 W. b) 8 W c) 12 W d) 240 W

Q7.

When car's collision occurs at a speed more than 45 Km/h air bags prevent injury to the head of a driver by opening between driver and the steering wheel, select the correct choice.

a) Air bag reduces collision time and increases force on driver's head.

b) Air bag increases collision time and decreases force on driver's head.

c) Air bag increases collision time and increases force on driver's head.

d) Air bag reduces collision time and force on driver's head.

Q8.

Mercury column at sea level stays at 76 cm. Density of mercury is 13.6 g/cm^3. If barometer is made using water of density 1 g/cm^3, then the length of water column would be:

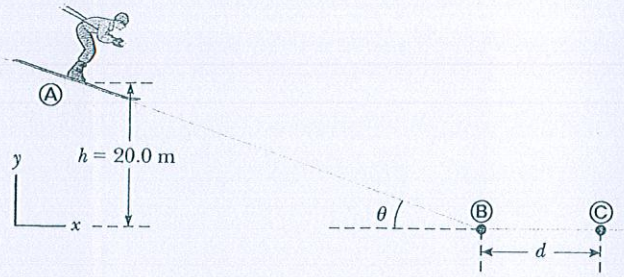
a) 76 cm. b) 152.5 cm c) 1033.6 cm d) 1233.5 cm

Part 2: Solve the following two problems in the space provided in between showing all your steps.

Problem 1: **(4 marks)**

A 60 Kg skier starts from rest at the top of a frictionless incline of height 20 m (See diagram).

a) What is total mechanical energy of skier at starting point?

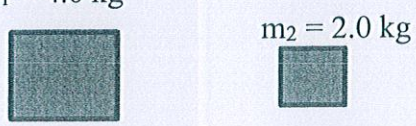


b) What is skier's velocity at point 'B'?

c) If frictional force between skier and the level ground is 120 N, how far does he travel on the level surface away from point 'B'?

Problem 2: (4 marks)

A 4.0 kg block moving to the right at 6.0 m/s undergoes an elastic head-on collision with a 2.0 kg block moving to the right at 3.0 m/s. The 4 kg block moves with 4 m/s after collision and keeps moving right.



a) What is the initial momentum of this system?

b) What is the velocity of 2 kg mass after collision?

c) Use your calculations to show momentum is conserved in this collision.

Problem 3: (4 marks)

The weight of a solid object in air is 5 N. When this object is completely submerged in water its weight in water is 3.5 N. Density of water is 1×10^3 Kg/m^3

a) What is the mass of the object?

b) What is the buoyant force on it?

c) What is the Volume of water displaced by object when it is fully immersed in water?

d) What is the density of this object?

(Do not remove)