



Prince Sultan University
Department of Mathematics & Physics
SCI 101- General Sciences
Second Exam
Second Semester, Term 142
Wednesday 22/4/2015
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 is **NOT** true about work?

- a) The net work done on an object equals the change in its kinetic energy.
- b) Work done against gravity is always zero.
- c) The unit used to measure work is equivalent to N.m.
- d) Work might be negative.

2) How many horsepower are there in 20 kilowatt?

- a) 14920 b) 26.8 c) 40.2 d) 26810

3) A car has a kinetic energy of 450 kJ. What kinetic energy would the car have if its speed is tripled and its mass is halved?

- a) 2025 kJ b) 675 kJ c) 337.5 kJ d) 450 kJ

4) A huge truck of mass 10800 kg is moving with the same kinetic energy as a 1200 kg small car moving at a speed of 15 m/s. What is the speed of the huge truck?

- a) 5 m/s b) 15 m/s c) 45 m/s d) 135 m/s

5) A ball is released from rest from the top of a 60 m high building. What is the speed of the ball at the moment when its height above ground is 15 m?

- a) 5 m/s b) 30 m/s c) 25 m/s d) 35 m/s

6) What is the physical quantity which is equal to the product of force and velocity?

- a) Work b) Power c) Energy d) Acceleration

7) What will be the length of the liquid column in a barometer at sea level when a liquid of density 4.1 g/cm^3 is used instead of mercury?

(given that the density of mercury is 13.6 g/cm^3 and the atmospheric pressure at sea level is 76 cm mercury)

- a) 252.1 cm b) 22.9 cm c) 1033.6 cm d) 5.6 cm

8) As long as the temperature does not change, when the volume of a gas is decreased by three times, its pressure is

- a) Decreased by three times
- b) Increased by three times
- c) Increased by nine times
- d) Does not change

9) **“A change in pressure at any point in an enclosed fluid at rest is transmitted to all points in the fluid.”** This is the statement of

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

10) A layer of oil of thickness 75 cm is floating above a swimming pool of water. What is the liquid pressure 3 meters deep measured from the upper surface of oil?

(given that the density of water is 1.1 g/cm^3 and the density of oil is 0.65 g/cm^3)

- a) 24750 Pa
- b) 4875 Pa
- c) 19875 Pa
- d) 29625 Pa

11) The weight of an object in air is 73 N and its weight when completely submerged in water is 49 N. What is the weight of water displaced by this object?

- a) 24 N
- b) 122 N
- c) 73 N
- d) 49 N

12) A lighter than air balloon does not rise indefinitely because

- a) The balloon becomes less dense with altitude
- b) The balloon becomes more dense with altitude
- c) Air becomes less dense with altitude
- d) Air becomes more dense with altitude

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

Problem 1: The mass of a car and its passengers is 1500 kg. The car was moving initially at a speed of 10 m/s. Calculate the new speed of the car after a 168 kJ of net work is done on it?

Problem 2: A block of wood of volume 1200 cm^3 and density 0.55 g/cm^3 is floating at the surface of a certain liquid such that 75% of its volume lies above the liquid. Calculate

a) Calculate the mass of the wooden block

b) Calculate the density of the liquid