Prince Sultan University

Department of Mathematics & Physics

SCI 101- General Sciences

Course Sections: 230-233

Second Exam

First Semester, Term 101

Monday 20/12/2010

Examination Time : 60 minutes

Name (Please Print)_____ Student I.D. _____
Section # _____ Seq. #. _____

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 **11multiple choice** questions, each question worth **1 point**. **Part 2** has **3** workout problems each is graded on a **2 point scale.***

Make sure your paper has all the questions and problems.

	Possible Score	**Student's Score**	**Student's Total Score**
Part 1 Questions	**11**	**1 x**	
Part 2: P. # 1	**2**		
P. # 2	**2**		
P. # 3	**2**		
Total	**17**		**/15**

Part 1: 10 Multiple Choice Questions (1 mark each

1) Object A has a mass of 5 kg and is moving at 4 m/s while object B has a mass of 2 kg and is moving at 10 m/s. Which of the following statements concerning objects A and B is true?

a) Object A has more momentum than object B.

b) Object A has less momentum than object B.

c) Object A has more kinetic energy than object B.

d) Object A has less kinetic energy than object B.

e) None of the above.

2) Which of the following units is equivalent to $kg \cdot \frac{m}{s}$?

a) $N.m$.

b) $N.s$.

c) Joul.

d) Watt.

e) None of the above.

3) During any collision between objects, which of the following is true?

b) Momentum is always conserved.

c) Kinetic energy is conserved but momentum is not conserved.

d) Both momentum and kinetic energy are always conserved.

e) Neither kinetic energy nor momentum is conserved.

4) If an object has kinetic energy, it must also have:

a) Potential energy.

b) Impulse.

c) Momentum.

d) Work.

e) All of these.

5) The force of gravitation between two bodies in the universe does not depend on
a) The distance between them.
b) The product of their masses.
c) The sum of their masses.
d) The gravitational constant.

6) The weight of an object of mass 15 kg at the centre of the earth is
a) 147 N
b) 147 kg
c) Zero
d) 150 N
e) 150 kg

7) A football player kicks his ball from the ground. When the ball is at the highest point of its flight:

a) The velocity and acceleration are both zero.

b) The x-velocity is zero and the y-velocity is zero.

c) The x-velocity is non-zero and the y-velocity is zero.

d) The velocity is non-zero and the acceleration is zero.

e) None of the above.

8) For a projectile, what is the acceleration in the x-direction?

a) Depends on the initial velocity.

c) Depends on how long it is in the air.

b) 0 m/s^2

d) Depends on the y-acceleration.

e) None of the above.

9) A bullet is fired horizontally from a gun. At the same time a similar bullet is dropped from the same height. Ignoring air resistance, the fired bullet will:

a) Hit the ground first
c) Hit the ground at the same time as the dropped bullet
b) Hit the ground second
d) Never hit the ground
e) Not enough information.

10) The speed of a satellite in its circular orbit
a) remains constant.
b) Varies.
c) Is zero.
d) All of these.
e) None of these.

11) A rock is lifted for a certain time by a force F that is greater in magnitude than the rock's weight W. The change in kinetic energy of the rock during this time is equal to the

a) Work done by the net force (F-W)
b) Work done by F alone
c) Work done by W alone
d) Difference in the momentum of the rock before and after this time
e) Difference in the potential energy of the rock before and after this time

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

Problem 1: In a baseball game, the catcher caught a 3 g ball thrown at a velocity of 10 $\frac{m}{s}$. If the impact time of the ball and the glove is 0.1 second, find the force acting on the catcher.

Problem 2: A car drove horizontally off a cliff which is 80 meters high. The car landed 100 meters from the base of the cliff. Ignoring air resistance, calculate how fast was the car traveling when it left the cliff?

Problem 3: calculate the power needed to increase the speed of a 4 kg block from 5m/s to 10m/s in a 3 seconds time interval.