

Prince Sultan University

Deanship of Educational Services

Department of Mathematics
and General Sciences



COURSE DETAILS:

Introduction to Physical Science		SCI101	MAJOR EXAM II
Semester:	Second Semester -- Term 182		
Date:	Monday, April 1, 2019		
Time Allowed:	60 minutes		

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	Circle the number of your section: 165 166 167 168
Instructor's Name:	Circle the name of your Instructor: Dr. Muaffaq Nofal, Dr. Hazem Abu-Farsakh

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work when required and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
- **Assume $g = 10 \text{ m/s}^2$**

GRADING:

	Page 1	Page 2	page 3	Page 4	Total
Mark					
Full Mark	6	6	4	4	20

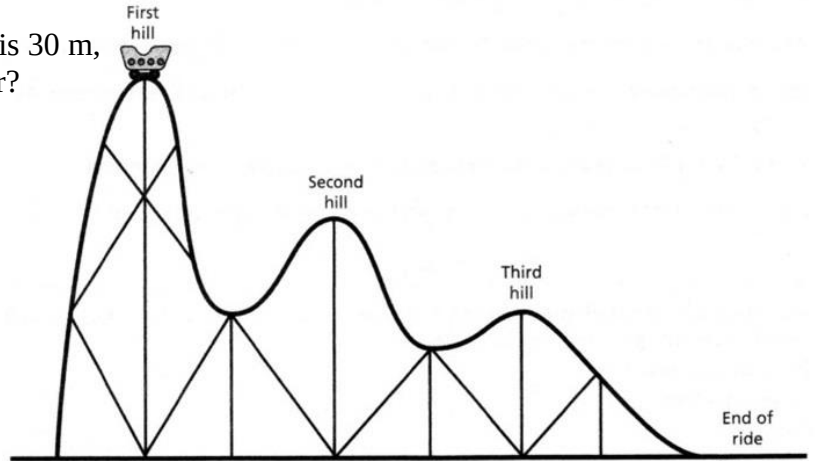
Part 1: 12 Multiple Choice Questions (1 mark each)

- 1) An object that has kinetic energy must be
- a) At ground. b) At a high location. c) At rest. d) Moving.
- 2) Which of the following is **NOT** true about work?
- a) The unit used to measure work is equivalent to N.m.
- b) Work might be negative.
- c) The net work done on an object equals the change in its kinetic energy.
- d) Work done against gravity is always zero.
- 3) What power is needed to lift a 3 kg box at constant speed to a height of 8 m in 12 seconds?
- a) 20 Watt b) 2 Watt c) 45 Watt d) 4.5 Watt
- 4) What is the gravitational attractive force between a ship of mass 95000 kg and a boat of mass 5600 kg when their centers are 120 m apart?
- a) 1.84×10^{-4} N b) 1.53×10^{-6} N c) 2.46×10^{-6} N d) 2.96×10^{-4} N
- 5) The buoyant force on an object that is completely submerged in a liquid does not depend on:
- a) the volume of the object.
- b) the density of the object.
- c) the density of the liquid.
- d) the acceleration of gravity
- 6) Which of the following is **NOT** true about liquid pressure?
- a) Liquid pressure does not depend on the surface area of the liquid.
- b) liquid pressure does not depend on the density of the liquid.
- c) Liquid pressure on a certain point is exerted in all directions, not only downward.
- d) Liquid pressure increases at larger depth.

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

Problem 1: A 650 kg roller coaster car starts from rest at the top of the first hill of its track and slides freely. Neglect friction.

a) (1 mark) If the height of the first hill is 30 m, what is the mechanical energy of the car?



b) (1 mark) If the speed of the car at the second hill is 12 m/s, what is the height of this hill?

c) (1 mark) If the height of the third hill is 10 m, what is the kinetic energy of the car at this hill?

d) (1 mark) What is the total work done on the car from the first hill to the second hill?

Problem 2:

Determine the final temperature when a 2 kg block of Lead at 60 °C is placed in contact with an 8 kg block of Aluminum at 10 °C. Given that the specific heat capacity of Lead is 150 J/(kg.°C) and the specific heat capacity of Aluminum is 900 J/(kg.°C).

Scratch paper