ALBERTA DISTANCE LEARNING CENTRE

Science 10 Online

SCN1270

Unit C: Section 1

Assignment C1: Part B

Student's Questions and Comments

FOR STUDENT USE ONLY

Student ID: _____

FOR ADLC USE ONLY

Assigned to: _____

Marked by: _____

Date received: _____

	Total	Total Possible
Lesson 2		8
Lesson 3		18
Lesson 4		12
TOTAL		**38**

Teacher's Comments:

_____

Teacher's Signature

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4601 - 63 Avenue
Barrhead, Alberta Canada T7N 1P4

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Unit C: Section 1: Lessons 2 to 4

Energy Flow in Technological Systems

Assignment C1: Part B

Instructions:

Complete the following assignment. This assignment will count toward your final mark in this course, and you will be allowed to submit this assignment only once. Make sure you answer all the questions. Blank or incomplete assignments will not be accepted for marks.

Remember, the number of marks each question is worth gives you a hint about how detailed you need to make your answers. Calculation questions require you to show all your work. This includes formula, substitution, and answer with correct significant digits and units.

Your online course will provide you with instructions on how to submit this assignment when it is time to submit it.

Total 8

Lesson 2: Work and Energy

(2)

1. You and your neighbour are mowing your lawns. If your neighbour pushes a lawnmower five time as far as you do but exerts only a half of the force, which one of you does more work and by how much? Remember to show all your work to explain your answer.

(3)

2. A bungee jumper with a weight of 588 N leaps off a bridge. He is in free fall for a distance of 24.0 m before the cord begins to stretch. How much work, in kilojoules, does the force of gravity do on the jumper before the cord begins to stretch? Show all our work.

bungee jumper

(3) 3. While helping a friend move, you lift a 176 N box full of books and perform 180 J of work to do so. What distance, directly upward, do you lift the box? Show all your work.

boy lifting box

Total 18

Lesson 3: Gravitational and Kinetic Energy Calculations

(3)

4. An elevator car has a mass of 750 kg, and its three passengers have a combined mass of 135 kg. If the elevator and its passengers ride to the ground floor, 20.7 m below, find the change in gravitational potential energy of the car and its passengers. Show all your work.

three people in elevator

(3)

5. A book with a mass of 1.25 kg gains 27.7 J of potential energy when it is lifted from the floor to a shelf. How high is the shelf above the floor? Show all your work.

old book

(3) 6. A boulder rests on a ledge 31.2 m above a lake. If it has 2.65×10^5 J of gravitational potential energy relative to the lake surface, what is the mass of the boulder? Show all your work.

large boulder sitting on ledge above lake

(3) 7. On a highway, a car with a mass of 1.1×10^3 kg is travelling at 25 m/s. What is the kinetic energy of the car? Show all your work.

car driving on highway

(3) 8. A girl is travelling on her bike at a speed 2.54 m/s. If the girl and her bike have a kinetic energy of 193 J, what is the combined mass of the girl and her bike? Show all your work.

girl riding her bike

(3) 9. A hockey puck has a mass of 0.20 kg. If the hockey puck is moving with 75 J of kinetic energy, what is its speed? Show all your work.

hockey puck on ice

Total 12

Lesson 4: Mechanical Energy

4

10. a. A 0.430 kg baseball comes off a bat and goes straight up in the air. At a height of 10.0 m, the baseball has a speed of 25.3 m/s. Determine the mechanical energy at this height. Show all your work.

baseball in air

2

b. What is the baseball's mechanical energy when it is at a height of 8.0 m? Explain.

(3) 11. A golfer hits a 42 g ball, which comes down on a tree root and bounces straight up with an initial speed of 15.6 m/s. Determine the height the ball will rise after the bounce. Show all your work.

tree roots on golf course

(3) 12. A girl pushes herself up a steep ramp in her wheelchair. She gains a vertical distance of 25.8 m when she reaches the top of the ramp. She turns around and coasts back down the ramp. If the combined mass of the girl and her wheelchair is 64.6 kg, what would be her coasting speed at the bottom of the ramp? Show all your work.

wheelchair ramp

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adlc.ca
1-866-774-5333
info@adlc.ca

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Box 4000 4601 – 63 Avenue
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