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**Chapter 3**

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Show Question Details

**Discussion 3.1: Should America switch to SI? 1 pts**

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Well I will answer the question posed in the title for you. Yes! Let's say that you get elected President of the United States and you make the decision that the US should switch to SI. You make an executive order, and overnight, the US is supposed to switch to the metric system. For this discussion, think of one good consequence, and one potentially disastrous consequence from America switching to metric overnight. Comment on a classmates response and have a discussion.

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**Ethics: Engineering Disaster 1 pts**

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For this prompt I would like you to consider a disaster, something like the Columbia disaster or any instance where an engineering mistake causes someone to lose their life. I want you to consider what the consequences should be and what should determine the consequences. For example, if I design a roller coaster and someone dies on the roller coaster, what questions should be asked? Do you instantly arrest the engineer? Or did the person that died do something they weren't supposed to do? Think through this and create a discussion post that describes a realistic or made up disaster, what questions need to be answered, and what consequences (if any) the engineer that designed the product should face.

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**Personal Reflection - Chapter 3 1 pts**

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What do you think about the content of this chapter? This was the first technical chapter we have had. Did you learn anything new? Do you need to do some more practice? Do some personal reflection.

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**Question 3.10: The Smoot 1 pts**

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Throughout their existence, fraternities have been making pledges as a rite of initiation into the fraternity. However, in my opinion, an MIT fraternity prank in 1958 is the most clever, long lasting, and humorous prank in existence. In October 1958, Oliver R. Smoot a pledge to the Lambda Chi Alpha fraternity was required to repeatedly lay down so they could use his height to measure the length of the Harvard Bridge. The bridge's length was measured to be 364.4 smoots plus or minus one ear. You are given that Oliver Smoot was 1.70 meters tall at the time of the prank. Using conversion factors and the steps outlined in this book, what is the length of the Harvard Bridge in feet? (Note: you can ignore the plus or minus one ear) Fun fact: Oliver Smoot became the chairman of the American National Standards Institute!

**Correct Answers**

2,032 (with margin: 203.2)

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**Question 3.1: Fundamental Dimensions and Symbols 1 pts**

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Without looking at the table above (because it totally defeats the purpose!) try and match the dimension to the symbol we will use to represent that dimension.

**Time**

T

**Mass**

M

**Length**

L

**Temperature**

\Theta

**Amount of substance**

N

**Light intensity**

J

**Electric Current**

I

Other Incorrect Match Options:

* t
* i
* m

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**Question 3.2: Quantity to Dimensions 1 pts**

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Match the Quantity to the Fundamental Dimensions that describe that quantity. The dimensions will be written in the "negative exponent" notation to indicate division for the sake of saving space. For some of these you may intuit the answer. For others, you may have to do some outside research in order to determine which of the dimensions match the quantity.

**Area**

L \* L

**Distance**

L

**Mass**

M

**Velocity**

L/T

**Acceleration**

L/T^2

Other Incorrect Match Options:

* L \* T
* L \* T^2

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**Question 3.3: Figure out the dimensions 1 pts**

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Consider electric potential. Electric potential is defined as the \_\_\_\_\_\_ needed per unit charge to move a test charge between two points. Analyzing the dimensions of electric potential show that it should be \_\_\_\_\_\_ L^2T^(-3) \_\_\_\_\_\_ ^(-1)

**Correct Answers:**

**Work**

**M**

**I**

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**Question 3.4: Derived Units 1 pts**

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Following the same logic presented above, match the appropriate derived dimension to the correct SI unit for that dimension. You may have to do a little background work (that is OK because that is a good brain workout!) to remind yourself what each derived dimensions represents.

**Area**

meter^2

**Volume**

meter^3

**Velocity**

meter \* second^{-1}

**Acceleration**

meter \* second^{-2}

**Density**

kilogram \* meter^{-3}

Other Incorrect Match Options:

* kilogram \* meter^2
* meter^{-3}
* meter \* second^2
* meter \* second^3

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**Question 3.5: Metric Prefix Practice 1 pts**

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For this problem, let's consider the dimension of Mass. We know that the SI (or metric) unit for mass is the kilogram. How many grams are in 1 kilogram?

**Correct Answers**

1,000 (with margin: 0)

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**Question 3.6: What do you know about 1? 1 pts**

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We all know that 1 is the loneliest number. Maybe it is because of its unique property when multiplied. What does 1 \* 1881 equal?

**Correct Answers**

1,881 (with margin: 0)

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**Question 3.7: Practice Converting Units 1 pts**

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Let's say that you are helping design a phone for a big company that has offices in the USA and in London. The office in London requests that the height of the phone be specified in centimeters. You know that the phone is 6 inches tall. Using the conversion factor (see table 3.5 above) and the process outlined above, what is the height of the phone in centimeters?

**Correct Answers**

15.24 (with margin: 0.24)

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**Question 3.8: Complicated Conversions 1 pts**

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Using the same process outlined above, convert 20 gal/sec to liters/sec

**Correct Answers**

1.2618 (with margin: 0.05)

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**Question 3.9: Complicated Conversions (Area) 1 pts**

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Using the same process outlined above, convert 14.2 in^3 to m^3. Make sure you are giving this a good try and working out your brain!

**Correct Answers**

0.0002 (with margin: 0.0001)

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**Request for Feedback - Chapter 3 1 pts**

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What did you think of this chapter? Anything stand out as exceptionally good? Anything that you would like to see differently? Any feedback is appreciated.

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