Energy Conversion Extra Practice Worksheet Name: Key

Please convert the following into Joules.

1. 3.56 kilojoules $1 \times 10^3\ J = 1\ kJ$ or $1000\ J = 1\ kJ$

$$\frac{3.56\ \cancel{kJ} \mid 1 \times 10^3\ J}{1\ \cancel{kJ}} = 3560\ J$$

rounded to sig fig = 3560 J

2. 5.6 kilocalories 2 steps!! $1 \times 10^3\ cal = 1\ kcal$ + $1\ cal = 4.184\ J$

$$\frac{5.6\ \cancel{kcal} \mid 1 \times 10^3\ cal}{1\ \cancel{kcal}} = 5600\ cal \qquad \frac{5600\ \cancel{cal} \mid 4.184\ J}{1\ \cancel{cal}} = 23430.4\ J$$

rounded to sig fig = 23000 J

3. 89 calories $1\ cal = 4.184\ J$

$$\frac{89\ \cancel{cal} \mid 4.184\ J}{1\ \cancel{cal}} = 428.446\ J$$

rounded to sig fig = 430 J

Please convert the following into calories.

4. 4500 joules $1\ cal = 4.184\ J$

$$\frac{4500\ \cancel{J} \mid 1\ cal}{4.184\ \cancel{J}} = 1075.525813\ cal$$

rounded to sig figs = 1100 cal

5. 587 kilojoules 2 steps!! $1 \times 10^3\ J = 1\ kJ$ and $1\ cal = 4.184\ J$

$$\frac{587\ \cancel{kJ} \mid 1 \times 10^3\ J}{1\ \cancel{kJ}} = 587000\ J \qquad \frac{587000\ \cancel{J} \mid 1\ cal}{4.184\ \cancel{J}} = 140296.3671\ cal$$

rounded to sig figs = 1.40×10^5 cal

6. 4.80 kilocalories $1 \times 10^3\ cal = 1\ kcal$ or $1000\ cal = 1\ kcal$

$$\frac{4.80\ kcal \mid 1 \times 10^3\ cal}{1\ kcal} = 4800\ cal$$

rounded to sig figs = 4.80×10^3 cal

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*** = Note these two problems could be solved in 1 step using 1 kcal = 4.184 kJ

Please convert the following into kilojoules.

*** 7. 45 kilocalories 3 steps !! 1×10^3 cal = 1 kcal and 1 cal = 4.184 J and 1×10^3 J = 1 kJ

① $45\ \text{kcal} \mid \frac{1\times10^3\ \text{cal}}{1\ \text{kcal}} = 45000\ \text{cal}$ ② $45000\ \text{cal} \mid \frac{4.184\ \text{J}}{1\ \text{cal}} = 188280\ \text{J}$

③ $188280 \mid \frac{1\ \text{kJ}}{1\times10^3\ \text{J}} = 188.280\ \text{kJ}$ rounded to sig fig = 190 kJ

8. 850 calories 2 steps !! 1 cal = 4.184 J and 1×10^3 J = 1 kJ

$850\ \text{cal} \mid \frac{4.184\ \text{J}}{1\ \text{cal}} = 3556.4\ \text{J}$ $3556.4\ \text{J} \mid \frac{1\ \text{kJ}}{1\times10^3\ \text{J}} = 3.5564\ \text{kJ}$

9. 905 joules 1×10^3 J = 1 kJ rounded to sig figs = 3.6 kJ

$905\ \text{J} \mid \frac{1\ \text{kJ}}{1\times10^3\ \text{J}} = 0.905\ \text{kJ}$ rounded to sig figs = 0.905 kJ

Please convert the following into kilocalories.

*** 10. 790 kilojoules 3 steps !! 1×10^3 J = 1 kJ and 1 cal = 4.184 J and 1×10^3 cal = 1 kcal

① $790\ \text{kJ} \mid \frac{1\times10^3\ \text{J}}{1\ \text{kJ}} = 790000\ \text{J}$ ② $790000\ \text{J} \mid \frac{1\ \text{cal}}{4.184\ \text{J}} = 188814.5315\ \text{cal}$

③ $188814.5315\ \text{cal} \mid \frac{1\ \text{kcal}}{1\times10^3\ \text{cal}} = 188.8145315\ \text{kcal}$

11. 563 calories 1×10^3 cal = 1 kcal rounded to sig figs = 190 kcal

$563\ \text{cal} \mid \frac{1\ \text{kcal}}{1\times10^3\ \text{cal}} = 0.563\ \text{kcal}$ rounded to sig fig = 0.563 kcal

12. 980 joules 2 steps !! 1 cal = 4.184 J and 1×10^3 cal = 1 kcal

$980\ \text{J} \mid \frac{1\ \text{cal}}{4.184\ \text{J}} = 234.22562214\ \text{cal}$

$234.22562214\ \text{cal} \mid \frac{1\ \text{kcal}}{1\times10^3\ \text{cal}} = 0.23422562214\ \text{kcal}$ rounded to sig figs = 0.23 kcal