## [For the following read page 621-622]

## Chemistry: Scientific Notation

### Part A: Express each of the following in standard form.

1. 5.2 x 10 <sup>3</sup>	5. 3.6 x 10 <sup>1</sup>
2. 9.65 x 10 <sup>-4</sup>	6. 6.452 x 10 <sup>2</sup>
3. 8.5 x 10 <sup>-2</sup>	7. 8.77 x 10 <sup>-1</sup>
4. 2.71 x 10⁴	8. 6.4 x 10 <sup>-3</sup>

#### Part B: Express each of the following in scientific notation.

1.	78,000	5.	16
2.	0.00053	6.	0.0043
3.	250	7.	0.875
4.	2,687	8.	0.012654

### Part C: Use the exponent function on your calculator (EE or EXP) to compute the following.

1. (6.02 x 10 <sup>23</sup> ) (8.65 x 10 <sup>4</sup> )	4. $(5.4 \times 10^4) (2.2 \times 10^7)$ 4.5 × 10 <sup>5</sup>
2. (6.02 x 10 <sup>23</sup> ) (9.63 x 10 <sup>-2</sup> )	5. $(6.02 \times 10^{23}) (-1.42 \times 10^{-15})$ 6.54 x 10 <sup>-6</sup>
3. <u>5.6 x 10<sup>-18</sup></u> 8.9 x 10 <sup>8</sup>	6. (6.02 x 10 <sup>23</sup> ) (-5.11 x 10 <sup>-27</sup> ) -8.23 x 10 <sup>5</sup>

## **Chemistry: Significant Digits**

- 1. Significant numbers are always measurements and thus should always be accompanied by the measurement's unit. For simplicity, units are not included in the following examples.
- 2. Any numbers (that are measurements) other than zero are significant. (Many times the zeros are also significant as you will see below.) Thus **123.45** contains five significant digits.
- 3. Any zeros between numbers are significant, thus 1002.05 contains six significant digits.
- 4. Unless told differently, all zeros to the left of an understood decimal point (a decimal that is not printed) but to the right of the last number are not significant. The number **921000** contains three significant digits.
- 5. Any zeros to the left of a number but to the right of a decimal point are not significant. **921000.** has six significant digits.
- 6. These zeros are present merely to indicate the presence of a decimal point (they are used as place holders), (these zeros are not part of the measurement). The number 0.00123 has three significant digits. The reason that these zeros are not significant is that the measurement 0.00123 grams is equal in magnitude to the measurement 1.23 milligrams. 1.23 has three significant digits, thus 0.0123 must also have three significant digits.
- 7. Any zeros to the right of a number and the right of a decimal point are significant. The value **0.012300** and **25.000** both contain five significant digits. The reason for this is that significant figures indicate to what place a measurement is made. Thus the measurement 25.0 grams tells us that the measurement was made to the tenths place. (The accuracy of the scale is to the tenths place.)

9. 0.0053567	120000		7.	8.002			13.	43.050	
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# **Answers to Significant Digit Worksheet:**

Give the number of significant digits in each of the following measurements:

1.	1 278.50	6	7.	8.002	4	13.	43.050	5
2.	<b>12</b> 0 000	2	8.	823.012	6	14.	0. <b>147</b>	3
3.	90 027.00	7	9.	0.00 <b>5789</b>	4	15.	6271.91	6
4.	0.00 <b>53567</b>	5	10.	2.60	3	16.	6	1
5.	<b>67</b> 0	2	11.	<b>542 000</b> .	6	17.	3.47	3
6.	0.00 <b>730</b>	3	12.	2 653 008.0	8	18.	387 465	6

Round off the following numbers to three significant digits:

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19. 120 000 = 1.20 x 105

20. 5.457 = 5.46

21. 0.0008769 = 0.000877 or 8.77 x 10-4

22. 4.53619 = 4.54

23. 43.659 = 43.7

24. 876 493 = 876 000 or 8.76 x 105
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<u>Perform the following operations giving the proper number of significant figures in the answer.</u>

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25. 23.4 x 14
                       327.6 =
                                     330 or 3.3 x 102
26. 7.895 + 3.4
                       11.295 =
                                     11.3
27. 0.0945 x 1.47
                       0.138\ 915 =
                                     0.139
28. 0.005 - 0.0007
                       0.0043 =
                                     0.004
29. 7.895 / 34
                       0.232\ 205\ 882 = 0.23
30. \ 0.2 + 0.0005
                       0.2005 =
                                     0.2
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