Title: **Engineering and Scientific Notation** Worksheet: 1

Course: Electrical Applications Unit: Electrical Theory CLO: 3

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall convert a decimal number to its engineering notation equivalent.
2. Student shall convert a decimal number to its scientific notation equivalent.
3. Student shall contrast the difference between representing number through decimal, engineering and scientific notation.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Worksheet. Grading shall be based on an answer key.

**Conventions**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Symbol | Decimal Value | Power of Ten |
| giga | G | 1,000,000,000 | 109 |
| mega | M | 1,000,000 | 106 |
| kilo | k | 1,000 | 103 |
| milli | m | 0.001 | 10-3 |
| micro | μ | 0.000001 | 10-6 |
| nano | n | 0.000000001 | 19-9 |
| pico | p | 0.000000000001 | 10-12 |

Rules for Engineering Notation

1. Numbers between 1 and 999 have no symbol associated with them.
2. Engineering numbers must contain at least one whole number but no more than three whole numbers.
3. Engineering numbers are rounded off at the third decimal places after the number is converted to engineering notation.

Examples of Engineering Notation:

139564.836 139.565k

2899271 2.899M

0.00281763 2.818m

0.000026754 26.754μ

837.16352 837.164

Rules for Scientific Notation

1. A scientific number shall have one digit to the left of the decimal and the remaining digits to the right of the decimal.
2. The magnitude of the number is expressed by a multiple of 10 (i.e. x102, x100, x10-3).
3. Scientific numbers may or may not be rounded off to a particular place. In this class we shall round off to three decimal places to the right of the decimal point.

Examples of Scientific Notation:

139564.836 1.396 x 105

2899271 2.899 x 106

0.00281763 2.818 x 10-3

0.000026754 2.675 x 10-5

837.16352 8.372 x 102

**Instructions**

Convert the following numbers to their equivalent forms.

Decimal Scientific Engineering

1. 1259943 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 0.0000253 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 0.000003537 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 0.00000032394 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. 652433489 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4.196 x 10-2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 8.974 x 10-8 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2.841 x 105 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 8.346 x 107 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 7.424 x 10-11 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 873.832k
12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 9.822m
13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 38.264G
14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 737.263μ
15. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 298.5n

Convert the Decimal Number to Engineering Notation and vise-versa

1. 0.0023 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 0.00045 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 0.0355 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 0.00000455 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. 0.8324 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. 154000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. 7834000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. 1200 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. 674000000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. 35000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 124p
12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 457μ
13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 35m
14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1.67n
15. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 103k
16. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1.27M
17. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4.5G
18. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3.592k
19. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 45.37μ
20. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 15.22p

Convert the following decimal numbers to engineering notation form.

1. 0.0321 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 649488 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 0.0196 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 158731 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Convert the following scientific notation numbers to their decimal form.

1. 8.726 x 104 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 7.9821 x 10-5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 7.326 x 105 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 1.3721 x 10-4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Convert the following decimal numbers to their scientific notation form.

1. 670811 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 0.0629 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 116780 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 0.00124 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Convert the following engineering notation numbers to their decimal form.

1. 351.2k \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 4.85μ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 23.25k \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 125k \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Convert the following scientific notation numbers to their engineering notation form.

1. 3.896 x 104 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 1.246 x 10-5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 1.836 x 104 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 7.326 x 10-3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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