ELECTRICAL MATHEMATICS
TEST 1 – *TRIAL TEST/ASSIGNMENT*

Notes:
- This test covers order of operations, fractions, significant figures, rounding, percentages, calculator usage, scientific/engineering notation, SI units, errors, approximations.
- The final test will be closed book, calculator permitted.
- It is **ESSENTIAL** to show working/steps, where asked, otherwise **no marks** can be given.

1. Calculate the following, **manually.**

   a. $2 - 4 + 5 \times 6 - 3$

   b. $15 (5-2) + 10/5 - 4$

   c. $(8/2 - 3 \times 2 + 10)/2$

   d. $12 - 20/(10 - 5)$

   e. $15 - (4 + 6 - 2) + 2 \times 3$

2. Calculate the following, **manually, showing all steps.**

   a. $\dfrac{5}{4} - \dfrac{5}{8}$

   b. $\dfrac{3}{7} \times \dfrac{5}{8}$

   c. $\dfrac{\dfrac{1}{4} + \dfrac{2}{3}}{\dfrac{1}{5}}$

   d. $3\dfrac{2}{5} \times 2\dfrac{5}{8}$

   e. $3\dfrac{2}{5} + 2\dfrac{5}{8}$

f. $\sqrt{\dfrac{9}{16}}$

g. $\sqrt{5\dfrac{4}{9}}$

h. $\dfrac{4}{5} \div 3$

i. $\sqrt{60+4}$

j. $\dfrac{3}{4} \div \dfrac{5}{7}$

3. Complete the following table by filling in the blanks:

	Usual Decimal	Scientific Notation	Engineering Notation
a.	510.0		
b.		7.5×10^4	
c.			22×10^6
d.	0.0000022		

4. Perform the following calculations, **manually, showing the steps taken:**

a. $2.2 \times 10^3 \times 3 \times 10^{-2}$

b. $(4.4 \times 10^4) \div (2.2 \times 10^3)$

c. $2.2 \times 10^4 + 2 \times 10^3$

d. $6000/(2 \times 10^4)$

5. Complete the following table by filling in the blanks:

	a.	b.	c.	d.	e.
Number Form	$3.3 \times 10^6\ \Omega$	$5 \times 10^{-3}\ A$			9000 V
Engineering Prefix			300 mV	200 kV	

6. What is the symbol of **AND** value for the following prefixes? Eg milli has symbol m and a value of 10^{-3}

   a. Kilo

   b. Pico

   c. Mega

   d. Nano

7. Round off the following numbers to 2 **decimal places**:

   a. 733.3333

   b. 6.5555

   c. 0.2279

   d. 0.00044332

   e. 44.999

8. Round off the numbers in question 7 to 3 (three) **significant figures**:

   a. 733.3333

   b. 6.5555

   c. 0.2279

   d. 0.00044332

   e. 44.999

9. Convert the following decimals and fractions to percentages, and vice-versa.

   a. ¼

   b. 0.45

   c. 50%

   d. 110%

   e. 10%

   f. 1/3

10. For the following, express the first quantity as a percentage of the second:

   a. 7 students, 10 students

   b. 100 V, 1 kV

   c. 10 mA, 1A

   d. 600 Ω, 50 Ω

11. Calculate the lower and upper values for the actual resistance of resistors with the following nominal values and tolerances:

   a. 1000 Ω, ±5%

   b. 470 k Ω, ±10%

12. Where is the evacuation point for the Electrical Mathematics classroom (in case of emergency)?

13. Using a calculator, calculate the values of the following expressions **AND** also manually estimate an approximate value for these expressions. **Show how** the estimate was obtained.

   a. 3.2 x 4.77 + 72.2

   b. $\pi \, 6.9^2$

------- **END OF TRIAL TEST/ASSIGNMENT -** *Check your work!* -------