Title: **Lab Final** Hands On: Final

Course: Electrical Applications Unit: Electrical Lab CLO: 2, 3, 4

Name ANSWER KEY Grade 100pts. Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall identify the resistor values based on the color code.
2. Student shall construct both AC and DC circuit, take voltage readings and analyze the results.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Hands On. Grading shall be based on instructor evaluation.

**Materials**

|  |  |
| --- | --- |
| Student Provided Materials | Department Provided |
| Proto-Board | Power Supply |
| Multimeter | Oscilloscope |
| Resistor Kit | Waveform Generator |
| Component Kit |  |
| Calculator |  |

**Instruction**

Complete the following resistor values based on the resistor color code.

1. Band 1 - Orange Resistor Value = 3.4kΩ

Band 2 - Yellow Tolerance in % = 5%

Band 3 - Red Tolerance in Ohms = 170Ω

Band 4 - Gold Minimum Resistor Value = 3.23kΩ

Maximum Resistor Value = 3.57kΩ

1. Band 1 - Gray Resistor Value = 8.6kΩ

Band 2 - Blue Tolerance in % = 10%

Band 3 - Red Tolerance in Ohms = 860Ω

Band 4 - Silver Minimum Resistor Value = 7.74kΩ

Maximum Resistor Value = 9.46kΩ

1. Band 1 - Brown Resistor Value = 10Ω

Band 2 - Black Tolerance in % = 20%

Band 3 - Black Tolerance in Ohms = 2Ω

Band 4 - None Minimum Resistor Value = 8Ω

Maximum Resistor Value = 12Ω

1. Band 1 - Green Resistor Value = 570kΩ

Band 2 - Violet Tolerance in % = 5%

Band 3 - Yellow Tolerance in Ohms = 28.5kΩ

Band 4 - Gold Maximum Resistor Value = 541.5kΩ

Maximum Resistor Value = 598.5kΩ

1. Band 1 - Red Resistor Value = 2.4kΩ

Band 2 - Yellow Tolerance in % = 5%

Band 3 –Red Tolerance in Ohms = 120Ω

Band 4 - Gold Minimum Resistor Value = 2.28kΩ

Maximum Resistor Value = 2.52kΩ

**Circuit**



Where;

Calculations

Calculate the expected values for the circuit shown above.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 53.333mW | 6.667mA | 1.2kΩ | 8V |
| R2 | 94.118mW | 11.765mA | 680Ω | 8V |
| R3 | 6.4mW | 800μA | 10kΩ | 8V |
| Total | 153.851mW | 19.231mA | 415.987Ω | 8V |

Measurements

Build the circuit shown above. Measure, record and/or calculate the actual values within the circuit.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |

**Instructions**

Have the instructor setup a waveform for you to determine the following measurements.

1. EPP \_\_\_\_\_\_\_\_\_\_
2. EP \_\_\_\_\_\_\_\_\_\_
3. Hz \_\_\_\_\_\_\_\_\_\_

Have the instructor setup another waveform for you to determine the following measurements.

1. EPP \_\_\_\_\_\_\_\_\_\_
2. EP \_\_\_\_\_\_\_\_\_\_
3. Hz \_\_\_\_\_\_\_\_\_\_

**Circuit**



Where;

**Instructions**

Calculate the expected values for the circuit shown above.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | P/Q/S | | I | | R/X/Z | E |
| R1 | 1.048mW | | 1.130mA | | 820Ω | 926.894mV |
| L1 | 582.839μVAR | | 1.130mA | | 456.159Ω | 515.623mV |
| Total | 1.199mVA | | 1.130mA | | 938.340Ω | 1.061V |
| θ | 29.087˚ | PF | 0.874 |

Build the circuit shown above. Measure, record and/or calculate the actual values within the circuit.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | P/Q/S | | I | | R/X/Z | E |
| R1 |  | |  | |  |  |
| L1 |  | |  | |  |  |
| Total |  | |  | |  |  |
| θ |  | PF |  |

1. Is there a phase shift between voltage and current in this circuit?
   1. Yes
   2. No
2. Is the calculated versus the measure phase shift within reasonable agreement?
3. Yes
4. No
5. Explain possible reasons that may create differences between the calculated and measured values.
6. Don’t you love working with oscilloscopes?
7. Yes
8. No

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