Title: **RL Circuits** Test: 15

Course: Electrical Applications Unit: Electrical Theory CLO: 3

Name ANSWER KEY Grade 42pts. Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall identify specific characteristics of both RL series circuits and RL parallel circuits.
2. Student shall calculate various inductive reactance, phase angle and power factor quantities based on given information for both series and parallel RL circuits.

**Assessment**

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

**Instructions**

Select the best answer to each multiple-choice question below.

1. The power triangle exists in any circuit that contains a reactive component?
2. True
3. False
4. The phase angle that exists in the impedance triangle can be a different value from that of the power triangle.
5. True
6. False
7. If the frequency increases, the inductive reactance (XL)?
8. Goes Up
9. Goes Down
10. Stays the same
11. If resistance is increased in a resistive-inductive (RL) circuit, the phase angle of the impedance triangle will?
12. Increase
13. Decrease
14. Stay the same
15. If the supply voltage is decreased, the power factor (PF) for an RL circuit will?
16. Increase
17. Decrease
18. Stay the same
19. In a purely inductive circuit (no resistance or capacitance) the relationship between voltage and current will be?
20. Voltage before current by 45˚
21. Current before voltage by 90˚
22. Voltage and current in phase
23. Voltage before current by 90˚
24. If two sinewaves are said to be “in phase”, theta will equal 90˚.
25. True
26. False

**Circuit**



**Instructions**

Using the circuit and information above, complete the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XL/Z | E | θ | PF |
| R1 | 87.853mW | 9.373 | 1kΩ | 9.373V | 0 |  |
| L1 | 165.599mVAR | 9.373 | 1.885kΩ | 17.668V | 90 |  |
| Total | 187.460mVA | 9.373 | 2.134kΩ | 20V | 62.053˚ | 0.469 |

**Circuit**



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XL/Z | E | θ | PF |
| R1 | 322.667mW | 14.667mA | 1.5kΩ | 22V | 0 |  |
| L1 | 128.385mVAR | 5.836mA | 3.77kΩ | 22V | 90 |  |
| Total | 347.270mVA | 15.785mA | 1.394kΩ | 22V | 21.697˚ | 0.929 |

1. Is there a phase shift between voltage and current in a resistor?
2. Yes
3. No
4. In a RL parallel circuit, as frequency increases the inductive current?
5. Increases
6. Decreases
7. Stays the same
8. In a RL parallel circuit, as the frequency increases the power factor?
9. Increases
10. Decreases
11. Stays the same