

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2015/2016**

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DIPLOMA IN ELECTRICAL ENGINEERING

**ECV 2150: ELECTRICAL ENGINEERING PRINCIPLES II.**

**DATE: AUGUST 2016 TIME: 11/2 HOURS**

**INSTRUCTIONS: -** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. State three factors that determine the amount of voltage generated in the process of a.c generation (3 marks)
2. Define the following a.c terms (5 marks)
3. Instantaneous value
4. Amplitude
5. Frequency
6. Q-factor
7. Resonance
8. Describe the effect of frequency on inductive reactance and current magnitude. (5 marks)
9. Derive an impression for resonant frequency. (5 marks)
10. With the aid of diagrams, illustrate the connection of three-phase, four wire star connected system. (5 marks)
11. Draw the wave form diagrams of a balanced three phase system for star or delta circuit (3 marks)
12. Explain two advantages of three phase over single phase circuits. (2 marks)

**QUESTION TWO (15 MARKS)**

1. A three branch parallel a.c circuit has the following in each branch:

Branch 1: 10A at an angle of 00

Branch 2: 30A at an angle of 400

Branch 3: 20A at an angle of -200

Calculate:

1. (I) Total current drawn from the supply

(II) Phase angle of the supply current

1. Represent your answer in the form 
2. Draw the phasor diagram showing three branch currents and the supply current. (12 marks)
3. With the aid of diagrams, show three different types of alternating waveforms. (3 marks)

**QUESTION THREE (15 MARKS)**

1. Show that the phase relationship between a voltage and current in a.c circuits is given by (6 marks)
2. A series R-L circuit containing a 200 resistor and a 0.5H inductor is energized by a 250v, 50Hz supply. Calculate:
3. The reactions of the inductor
4. The impedance of the circuit
5. The current the circuit
6. The phase angle between the current and voltage
7. The p.d across the resistor and the inductor
8. Draw the phasor diagram of the circuit. (9 marks)

**QUESTION FOUR (15 MARKS)**

1. Explain the effect of incorrect connection of one phase in a delta connected system. (4 marks)
2. Show how loads can be connected to a generator using delta connection. (5 marks)
3. Three 10 resistors are connected to a balanced 440v three phase supply, if the resistors are connected in
4. Star
5. Delta

Calculate in each case, the phase current and the line current. (6 marks)