



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

EED 211: ELECTRICAL PRINCIPLES IV

DATE: 9/5/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS:

Answer question one and Two other questions

QUESTION ONE (30 MARKS)

- a) Briefly explain the difference between single phase and three phase (10 marks)
- b) Briefly explain the difference between star connection and delta connection (10 marks)
- c) With the aid of power triangle, discuss the following types of power
 - i. Active power
 - ii. Apparent power
 - iii. Reactive power (10 marks)

QUESTION TWO (20 MARKS)

- a) briefly explain symmetrical fault and unsymmetrical fault (5 marks)
- b) differentiate between line and phase voltage
- c) Discuss the following major faults that occurs in 3 ϕ
 - Line to ground (L_G) fault
 - Phase to phase (L_L) fault
 - Double line to ground fault (L-L-G) fault (15 marks)

QUESTION THREE (20 MARKS)

- a) with an aid of a diagram show how a delta connection can be transformed into star connection (10 marks)
- b) The three resistances on a delta connection are, $R_{ab}=60\Omega$, $R_{ca}=50\Omega$ and $R_{bc}=40\Omega$, calculate the equivalent resistance when transformed into star. (10 marks)

QUESTION FOUR (20 MARKS)

- a) A star connected 3ϕ load has a resistance of 30Ω and a capacitive reactance of 10Ω in each phase. It's to be supplied from $400\text{V } 3\phi$ balanced supply
Find
- The line currents
 - Total amperes
 - Active power
 - Reactive power
- b) Draw the phasor diagram showing phase voltages, line voltages and line currents (20 marks)

QUESTION FIVE (20 MARKS)

- a) state the formulas for calculating the following
- 3ϕ power in delta connection
- 3ϕ power in star connection
- Line and phase voltage in both star and delta connection (5 marks)
- b) state and explain 5 main advantages of 3ϕ system as compared to single phase (15 marks)