MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR
DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING
EED 310: ELEMENTS OF POWER SYTSEMS

DATE: **TIME:**

INSTRUCTIONS
Answer Question ONE And Any Other Two

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Explain the following terms with reference to Faults

  i)   positive sequence

  ii)   negative sequence

  iii)   a' operator   (6 marks)

 b) List the assumptions made in analysis of asymmetrical faults   (4 marks)

c) Explain the following terms with reference to protection

   i) Pick up value

   ii) Actuating quantity   (4 marks)

 d) In a 3-Phase, 4-wire system the currents in the RYB are

   $I_{R\ equals}$ 200 at 60^0 A I_Y Equals 50 at 150^0A I_B equals 70 at 180^0A

   Calculate all the sequence currents in the R

                                                                            (10 marks)

e) Explain the Three zones of protection of a power system element

(6 marks)

QUESTIONTWO (20 MARKS)

a) With reference to Three phase fault studies, explain the terms;

    i. Asymmetrical Faults

    ii. Symmetrical Faults (4 marks)

b) Derive an expression for Negative sequence in three phase faults (6 marks)

c) The sequence voltages in the red phase are

E_{R0} equals 150V E_{R1} equals 160-j80V E_{R2} equals -100V

Calculate E_r, ,E_y ,E_b (10 maarks)

QUESTION THREE (20 MARKS)

a) Explain with the aid of diagrams the operation of

    i   horn gap

    ii   arcing horn

    iii   earth wire

QUESTION FOUR (20 MARKS)

a)With the aid of a diagram ,explain the operation of the Peterson coil (14 marks)

b)list the Six routine procedures of maintainace of overhead lightining arresters (6 marks)

QUESTION FIVE (20 MARKS)

a) Explain the following terms with reference to line classifications

    i Voltage regulation

    ii Transmission efficiency (6 marks)

b) Explain any THREE types of overhead line classification (4 marks)

c Explain any FIVE characteristics of a desirable protection (10 marks)