MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

EED 310: ELEMENTS OF POWER SYSTEMS II

DATE: 9/8/2016   TIME: 8:30 – 10:30 AM

INSTRUCTIONS
Answer Question One And Any Other Two Questions

1. 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)   primary

   ii) back up protection   (4 marks)

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

   I_R = 100at 30 A I_Y = 50 at 300A I_B = 30 at 180A

   Calculate all the sequence currents in the R phase

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e) Explain with reference to surge apparatus

i) Advantages of neutral earthing

ii) Peterson coil operation (8 marks)

2. 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} = 100V $\qquad$ E_{R1} = 200-j100V $\qquad$ E_{R2} = -100V

Calculate E_r, ,E_y ,E_b (10 marks)

3. a) Explain with the aid of diagrams the operation of

    i) $\qquad$ horn gap

    ii) $\qquad$ arcing horn

    iii) $\qquad$ earth wire

(20 marks)

4. a) Explain the method of neutral earthing

(4 marks)

b) Derive the expression for the peterson for capacitance of a coil.

(10 marks)

c) Explain the earhing sequence of a transformer (6 marks)

5. a) With the aids of a diagram explain the operation of the following protection schemes

    i) Metz-price

    ii) buchholz relay (10 marks)

b) Explain briefly some of the faults which occur on alternators (10 marks)