



MACHAKOS UNIVERSITY COLLEGE

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

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND SEMESTER EXAMINATION FOR CERTIFICATE IN ELECTRICAL AND
ELECTRONICS ENGINEERING

EPC 213: ELECTRICAL MAINTENANCE AND FAULT DIAGNOSIS

DATE: 2/8/2016

TIME: 2:00 – 4:00 pm

INSTRUCTIONS

Attempt question ONE and any other two questions

QUESTION ONE

- (a) Describe the following terms of maintenance:-
- (i) Preventive.
 - (ii) Corrective.
 - (iii) Running. (9 marks)
- (b) State any **FIVE** advantages of planned preventive maintenance. (5 marks)
- (c) (i) Define temperature rise as applied to transformers (2 marks)
- (ii) With aid of a well labeled diagram, describe the following test carried out on transformer oil.
- I. Flash point
 - II. Crackle
 - III Sight (12 marks)

- (d) Differentiate between the following terms:- Total preventive maintenance and Servicing

(2 marks)

QUESTION TWO

- (a) State **THREE** faults found in underground cables. (3 marks)
- (b) With aid of a well labeled circuit diagram, describe the Varley loop test method used to locate the position of earth fault in underground cables. (15 marks)
- (c) A twin cable of length 1000 metres has developed a low resistance earth on one core. A fall of potential test is taken from both ends, P and Q. The readings taken at P are $V_1 = 15V$, and $I_1 = 3A$. The readings at Q are $V_2 = 30V$, and $I_2 = 3A$. Find the position of the fault. (2 marks)

QUESTION THREE

- (a) State **FOUR** defects caused by armature reaction (4 marks)
- (b) State any two **causes and remedies** for the following faults in DC machines
- (i) Heat in generator
 - (ii) Noise in generator (4 marks)
- (c) With the aid of a well labeled diagram, describe the following tests conducted in a DC motor and in each case state **ONE** cause and remedy for each condition.
- (i) Earth test on fields
 - (ii) Short circuit test between armature to field (6 marks)
- (d) With the aid of a labeled diagram describe the **Swinburne test** done on DC machine. (6 marks)

QUESTION FOUR

- (a) (i) State any **FOUR** properties of carbon that make it suitable for machine brushes.
- (ii) Explain with aid of well labeled diagrams describe the following methods used to minimize armature reaction in DC machines.
- I. Inter poles
 - II. Compensating winding (12 marks)
- (i) Explain the following terms with reference to dc machines.
- (i) Back emf
 - (ii) Eddy currents (4 marks)
- (j) Explain the possible causes of the following symptoms in dc machine.
- (i) Brush sparking at commutator
 - (ii) Dc generator fails to build up its voltage (4 marks)

QUESTION FIVE

- (a) State **THREE** methods used to dry electric motors. (3 marks)
- (b) Outline the procedure used to align motor and the driven load (4 marks)
- (c) (i) State **THREE** causes of single phasing of three phase induction motors. (3 marks)
- (ii) Explain the effect of low voltage to the performance of an induction motor (3 marks)
- (d) With the aid of a well labeled diagram, describe the following tests conducted in a AC motor.
 - (i) Continuity and short circuit test on running wing
 - (ii) Earth test on running winding (7 marks)