



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL AND ELECTRONIC ENGINEERING

EPC 214: INDUSTRIAL MACHINE AND CONTROL

DATE: 6/5/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Define a PLC control. (4 marks)
- b) State the major operation cycles of PLC. (10 marks)
- c) Highlight the major input and output devices of a PLC (6 marks)
- d) Explain the construction of an alternator (6 marks)
- e) list the Four conditions observed when connecting alternators in parallel (4 marks)

QUESTION TWO (20 MARKS)

- a) List the FIVE characteristics of synchronous motor (5 marks)
- b) Explain the working principle of hysteresis motor (5 marks)
- c) List the major PLC hardware components (5 marks)
- d) List any 3 advantages and disadvantages of PLC control. (6 marks)

QUESTION THREE (20 MARKS)

- a) Explain the need for power factor improvement in machine control (4 marks)
- b) List the advantages and disadvantages of static capacitor method of power factor improvement (8 marks)
- c) Explain any FOUR types of enclosures for motors (8 marks)

QUESTION FOUR (20 MARKS)

- a) Explain the following terms as applied to duty cycles
 - i. Continuous rating
 - ii. Intermittent
 - iii. Short time rating (6 marks)
- b) List SIX factors to consider for the choice of a drive (6 marks)
- c) With the aid of diagrams, explain the following drives
 - i. Group
 - ii. Individual (8 marks)

QUESTION FIVE (20 MARKS)

- a) Explain the constructional features of a synchronous motor (6 marks)
- b) List any major faults and remedies in the following motors
 - i. DC Motors
 - ii. Induction Motors
 - iii. Single Phase Motors
 - iv. Alternators (14 marks)