



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL ENGINEERING

EPC 214: INDUSTRIAL MACHINE AND CONTROL

DATE: 19/10/2020

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer Question One and any Other Two Questions

QUESTION ONE (30 MARKS)

- a) Define a PLC control. (2 marks)
- b) State the major operation cycles of PLC. (4 marks)
- c) Highlight the major input and output devices of a PLC (6 marks)
- d) Explain any FOUR types of switches used in machine control (4 marks)
- e) Explain any THREE types of protective devices in machine control (4 marks)
- f) Explain the following terms as applied to duty cycles
 - i. Continuous rating
 - ii. Intermittent
 - iii. Short time (6 marks)
- g) List Four factors to consider for the choice of a motor drive (4 marks)

QUESTION TWO (20 MARKS)

- a) i) Define a contactor system of control
- b) ii) State any Three components of contactors in industrial motor control (6 marks)

- c) With the aid of a diagram, explain the working of a magnetic contactor (6 marks)
- d) i) List the major components of a control panel
ii) Enumerate the major steps of control panel design (8 marks)

QUESTION THREE (20 MARKS)

- a) Explain the 3 mounting methods of motors. (6 marks)
- b) List any six steps during the mounting of a given motor. (6 marks)
- c) Explain any FOUR types of enclosures for motors (8 marks)

QUESTION FOUR (20 MARKS)

- a) with the aid of diagrams, explain the operation of the following motors
i) Metadyne motor
ii) Homopolar motor
iii) Hysteresis motor (10 marks)
- b) Explain the major steps of the motor mounting in industrial machines control (10 marks)

QUESTION FIVE (20 MARKS)

- a) Explain briefly the operation of the following motors
i) Induction motor
ii) Synchronous motor
iii) Dc motor (6 marks)
- b) Explain the Three motor protection areas in industrial machine control (6 marks)
- c) Explain the Four motor operational control areas in industrial control (8 marks)