



# MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

EED 311: MACHINES AND UTILIZATION II

DATE: 8/5/2019

TIME: 8.30-10.30 AM

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## INSTRUCTIONS:

*This paper consists of **FIVE** Questions. Answer Question ONE and ANY OTHER TWO questions.*

### QUESTION ONE (30 MARKS) (COMPULSORY)

- a) Define Refrigeration and explain the principle of refrigeration. (5 marks)
- b) Name types of special machines. (4 marks)
- c) State the four advantages of the electric drive. (4 marks)
- d) State and explain the parts of a refrigeration system (8 marks)
- e) Why braking is required? Explain each of the electrical braking briefly (6 marks)
- f) State three applications of Capacitor-Start Motor. (3 marks)

### QUESTION TWO (20 MARKS)

- a) Explain the following terms
  - i. Refrigeration effect.
  - ii. Tonofrefrigeration.
  - iii. Co-efficient of Performance (COP). (6 marks)
- b) Write disadvantages of an electric drive system (4 marks)
- c) State and Explain **three** methods of starting an Induction motor (6 marks)
- d) Name types of systems of traction. (4 marks)

**QUESTION THREE (20 MARKS)**

- a) With a neat sketch, explain the working of vapour absorption refrigeration system. (10 marks)
- b) Name the most commonly used refrigerants and state their uses. (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Mention the desirable properties of a good refrigerant and explain. (10 marks)
- b) The distance between two stations is 1.92kms. The scheduled speed and the duration of stops respectively are 40kmph and 20sec. assume the quadrilateral approximation of the speed-time curve and the coasting and braking retardation as 0.16kmphps and 3.2kmphps respectively. Determine the acceleration if the speed at the end of the accelerating period is 60.8kmph. Find also the duration of the coasting period. (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) With a neat sketch, explain the working of Vapour Compression Refrigeration system (10 marks)
- b) With an aid of well labeled diagram, explain the working principle of Capacitor-Start Capacitor-Run Motor (10 marks)