



# TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

## UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL ENGINEERING

EEP1201:ELECTRICAL POWER EQUIPMENT

SPECIAL/SUPPLEMENTARY EXAMINATION

**SERIES: SEPTEMBER SERIES**

**TIME: 2 HOURS**

**DATE: Sep 2018**

### Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Answer any THREE Questions.

**Do not write on the question paper.**

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### QUESTION ONE

- (a) (i) Explain what is meant by commutation in a D.C. machine and what steps can be taken to reduce any adverse effects. (7 marks)
- (ii) State methods of improving commutation (4 marks)
- (i) Explain why a D.C. motor is not directly connected on to the supply. (5 marks)
- (ii) State the main features and purposes of a D.C. face plate starter (4 marks)

### QUESTION TWO

- (a) (i) With the aid of a labelled diagram explain how a three phase induction motor is started using star-delta method.
- (ii) State the procedure as the induction motor speeds up (9marks)
- (b) (i) Explain how a squirrel cage induction motor operates
- (ii) State its advantage over the other induction motors (7marks)
- (c) State typical applications for squirrel cage induction motors in the industries (4marks)

### QUESTION THREE

- a) Explain :-
- (i) Why synchronous machine is not self-starting
- (ii) Two methods of starting synchronous motors (8marks)
- (iii) State the uses of synchronous motors (4marks)

- b) (i) State the conditions to be fulfilled before a synchronous machine is connected to the supply (4marks)
- (ii) Explain why the power factor of a synchronous motor working on a constant load depends on its excitation (4marks)

#### **QUESTION FOUR**

- (a) (i) State three types of a single phase motors and explain which type is best suited to be used when on load starting is required.
- (ii) State three applications for split phase single phase motor (9 marks)
- ( b ) (i) The magnetic field produced by single phase motor is pulsating show by sequence of two diagrams, how the rotating magnetic field is set up (8 marks)
- (ii) State two methods of induction motor speed control (3 marks)

#### **QUESTION FIVE**

- (a) ( i ) With the aid of a waveform and phasor diagram, explain how a rotating magnetic field is produced in a 3-phase system. Show at least six instances (12 marks)
- (ii) Explain why induction motors do not run at zero slip (3 marks)
- (b) With the aid of sketches, Explain how torque is produced on rotor conductors of a three phase induction motor. (5 marks)