



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL POWER ENGINEERING (CEPE 3) PP1

ELECTRICAL POWER EQUIPMENT

EEP 1204

END OF SEMESTER EXAMINATION SERIES: MAY 2016

TIME: HOURS

DATE:

Instructions to Candidates

You should have the following for this examination

Answer booklet, examination pass and student ID

This paper consists of five Questions; Attempt any THREE Questions.

DO not write on the question paper.

QUESTION ONE

- (a) (i) Describe with the aid of a diagram the construction of a d.c machine.
(ii) Explain the main features and purpose of a D.C face plate starter (9marks)
- (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)

QUESTION TWO

- (a) (i) state two methods by which windings are wound around the armature.
(ii) Derive the emf equation of a generator (8marks)
- (b)(i) Describe commutator windings
(ii) State three items that constitute the impedance of the generator (8marks)
- (b) Explain the difference between wave winding and lap winding (4marks)

QUESTION THREE

- (a)(i) With the aid of a 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)
- (a) (i) Explain how a squirrel cage induction motor operates
(ii) State its advantage over the other induction motors (6marks)
- (c) State typical applications for squirrel cage induction motors in the industries (5marks).

QUESTION FOUR

- a) (i) With the aid of a diagram describe the constructional details of one type of rotor used in large synchronous generators. (5marks)
- (ii) If the generator has four poles, calculate: _

- I. The generator speed when generating 5Hz
- II. The generated frequency at full load (8marks)

- b) (i) Explain the 'V' characteristics of the synchronous motor s .
(7 marks)
- c) (ii) State three advantages of a synchronous motor over the normal induction motors (7 marks)

QUESTION FIVE

- (a)(i) With the aid of a diagram explain the principle of operation of a capacitor start single phase induction motor.
 - (ii) State two applications for the motor in (a) (i) above (7marks)
- b) (i) Draw the typical torque/speed characteristics of the single phase induction motor.
 - (ii) State how the direction of rotation of a single phase induction motor can be changed.
(8 marks)
- c. Explain briefly why a single phase motor is not self-starting (5marks)