



**TECHNICAL UNIVERSITY OF MOMBASA**

*Faculty of Engineering and Technology*

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL POWER ENGINEERING (CEPE 2) PP1

**ELECTRICAL INSTALLATION TECHNOLOGY 11**

**EEP 1105**

**END OF SEMESTER EXAMINATION**

**SERIES: DECEMBER 2016**

TIME: 2 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) Define the following terms as used in electrostatics
- I. Capacitor
  - II. Capacitance
  - III. Die- electric
- (ii) Derive an expression for the total capacitance of three capacitors connected in parallel (8 marks)
- (b) (i) Two capacitors having capacitance of  $15\ \mu$  and  $5\ \mu$  respectively are connected in parallel across a 240 V supply.  
Determine :-
- I. The P.d across each capacitor
  - II. The charge on each capacitor
  - III. Total energy stored in the circuit (9marks)
- (ii) State three types of capacitors (3marks)

### QUESTION TWO

- a (i) With the aid of a well labeled diagram describe the moving coil measuring instrument (5marks)
- (ii) A permanent magnet moving coil measuring instrument gives full scale deflection at 30mv and 10 mA current find the resistance of the multiplier necessary to convert to a
- I. Ammeter 0-3A.range
  - II. Voltmeter 0 - 50v range (7marks)
- b(i) With the aid of a well labeled diagram describe the attraction type moving iron instrument.  
(ii) State three advantages of this meter in b (i) above over the moving coil type (8marks)

### QUESTION THREE

- (a)(i) With the aid of a diagram describe a direct-on -line starter for a 3phase motor.  
(ii) State three reasons for using a starter to operate electrical machine (9marks)
- b (i) Explain the effects of the following in motor operation
- (I) Dust
  - (II) Oil and grease
  - (III) Moisture ( 8marks)
- C. State three causes of electrical plant break down. (3marks)

### QUESTION FOUR

- a (i) Explain using a diagram two methods by which transformers windings are wound around the iron core (6 marks)
- (ii) Name all the losses which occur in a transformer, compare value of the losses when the transformer is (A) on no load (b) on full load (5 marks)
- b(i) State the tests carried out on the transformer to determine its efficiency (4marks)
- (II) Explain the conditions which must be fulfilled so that two three phase transformer may operate in parallel (5marks)

### QUESTION FIVE

- a (i) Describe with aid of diagram the construction of a D.C Machine  
(ii) State three types of a D.C machines ( 8 marks)
- b (i) Explain what is meant by commutation in a D.C Machine and what steps can be taken to reduce any adverse effects.  
(ii) State methods of improving comutatation ( 8marks)
- c. Explain the purpose for using a d.c face plate starter. ( 4 marks)