



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY

ELECTRICAL ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR

BARCHELOR OF TECHNOLOGY IN ELECTRICAL AND ELECTRONICS ENGINEERING

TEE 4103 ELECTRICAL INSTALLATION TECHNOLOGY **PP2**

END OF SEMESTER EXAMINATION

SERIES: MARCH 2025

TIME: 2 HOURS

DATE: MARCH 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** Questions; Question ONE is compulsory. In addition attempt any Other TWO Questions.

Do not write on the question paper.

Question ONE (Compulsory 20 marks)

- (a)(i) State any TWO reasons for earthing **(2mks)**
- (ii) Describe electric shock and describe when it becomes lethal **(3mks)**
- (iii) With aid of a sketch describe the PME earthing method and state TWO of its limitations **(5mks)**
- (b)(i) State TWO factors against which an installation need to be protected **(2mks)**
- (ii) With aid of sketches describe the importance of polarity test **(4mks)**
- (iii) With aid of a sketch describe the measurement of earth resistance area. **(4mks)**

Question 2

- (a)(i) State TWO reasons for fitting a protective switch gear in an installation **(2mks)**

(ii) With aid of a sketch describe the construction and principle of operation of electromagnetically operated over current release with a time delay **(4mks)**

(iii) With aid of a sketch describe the construction and TWO applications of HBC fuse **(4mks)**

(b)(i) Describe the need of automatic earth protection methods **(2mks)**

(ii) With a sketch describe the construction and principle of operation of residual current ELCB **(4mks)**

(iii) With aid of a sketch describe determination of the earth continuity conductor resistance using current injection method. **(4mks)**

Question 3

(a)(i) Describe the construction of the cables to be used in the following conditions (i) In outdoor (ii) Where there is likelihood of mechanical damage to conductors and insulation **(4mks)**

(ii) Describe the construction and application of the following types of cables (i) Circular flex (ii) Circular flex rubber sheathed **(4mks)**

(iii) With aid of a circuit describe the importance of insulation resistance test **(2mks)**

(b)(i) Describe the construction and application of the following sheathed wiring systems (i) PCP (Polychroprene sheathed wiring system) (ii) PVC-SWA Cables wiring system. **(4mks)**

(ii) With aid of a sketch describe insulation test between conductors and earth. **(3mks)**

(iii) With aid of a the earth fault loop impedance using line earth loop tester **(3mks)**

Question 4

(a)(i) Draw a circuit for sequence of control at the intake for three phase installation **(4mks)**

(ii) Draw sequence of control at the intake point for single phase installation **(4mks)**

(iii) State TWO factors to be considered during selection of a cable for particular use **(2mks)**

(b) (i) Draw circuit diagram for TWO lamps controlled by one way switch and three lamps each controlled by one way lamps independently **(4mks)**

(ii) Six lamps controlled from five independent positions **(3mks)**

(iii) FIVE lamps controlled from two positions independently **(3mks)**

Question 5

(a)(i) State TWO earthing systems in common use **(2mks)**

(ii) (ii) Define the following terms used with earthing (i) Solidly earthed (ii) Earth lead **(4mks)**

(iii) With aid of sketches describe the following methods of earthing (i) Rode electrode (ii) Earth matt **(4mks)**

(b)(i) Illustrate cable rating and circuit breaker size for (i) Final subcircuits rated over 15A (ii) Final subcircuits rated below 15A. **(6mks)**

(ii) With of a sketch describe the construction and operation of a thermal trip system **(4mks)**