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 **PP1 AUG 2024**

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2024

TIME: 2 HOURS

DATE: AUGUST 2024

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) Describe the following terms as used with earthing (i) Earth resistance (ii) Earth continuity conductor **(2mks)**

(ii) With aid of a sketch describe the following earthing methods stating ONE application of each

(i)Plate electrode (ii) Earth Mats **(4mks)**

(iii) With aid of a sketch describe the principle of operation of a residual current ELCB **(4mks)**

(b)(i) State the difference between testing and inspection **(2mks)**

(ii) With aid of a sketch describe the single phase sequence of control from the intake point **(4mks)**

(iii) With aid of a sketch describe how to carry out insulation resistance test between conductors and earth **(4mks)**

Question 2

(a)(i)Describe the reason for carrying out earthing tests in a complete installation **(2mks)**

(ii)With aid describe the earth fault loop and explain why its impedance should be tested **(4mks)**

(iii) With aid of a sketch describe how to carry out earth fault loop impedance test **(4mks)**

(b)(i) State TWO characteristic of a good insulator (**2mks)**

(ii) With a sketch describe the construction of the following cables (i) PVA armored cable (ii) Workshop or industrial flex **(4mks)**

(iii) State the best cable for the following installation (i) Out door installation between houses (ii) Underground installations (iii) Connection to house hold appliances ie iron, kettles (iv)Termination in internal parts of a cooker**(4mks)**

Question 3

(a)(i) Describe a wiring system **(2mks)**

(ii) Describe sheathed wiring system and state TWO insulating material used **(4mks)**

(iii) Describe the construction of the following wiring systems and state ONE application of each (i) PCP(Polychloroprene) (ii) PVC-SWA cables**(4mks)**

(b)(i) Explain the need for earth electrode resistance test **(2mks)**

(ii) With aid of a sketch describe how to carry out earth electrode resistance test **(4mks)**

(iii) With aid of a sketch describe how to carry out earth continuity resistance test by current injection method **(4mks)**

Question 4

(a)(i) Define the following as used with fuses (i) Fusing factor (ii) Current rating **(2mks)**

(ii) Describe the following as used in excess current protection (i) Overload (ii) A short circuit **(4mks)**

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

(b) (i) State TWO major differences between a fuse and a circuit breaker**(2mks)**

(ii) With aid of a sketch describe the operation of a circuit breaker with magnetic tripping **(4mks)**

(iii) With aid of a circuit diagram describe the operation of a contactor to protect a given circuit **(4mks**

Question 5

(a)(i) Draw a circuit for sequence of control at the intake for three phase installation **(3mks)**

(ii) Draw sequence of control at the intake point for single phase installation **(3mks)**

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

(b)Draw the following circuit diagrams (i) Six lamps controlled from five independent positions **(3mks)**

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

(iii) Illustrate cable rating and circuit breaker size for (i) Final subcircuits rated over 15A (ii) Final subcircuits rated below 15A.**(4mks)**