



TECHNICAL UNIVERSITY OF MOMBASA

School of Engineering

Department of Electrical and Electronic Engineering

UNIVERSITY EXAMINATION FOR:

Bachelor of Science in Electrical & Electronic Engineering

TEE 4102: WORKSHOP TECHNOLOGY & PRACTICE II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2025

TIME: 2 HOURS

DATE: April 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 30 marks)

(a)(i) Draw electrical symbols of the following (i) Cord operated single pole one way switch (ii) Distribution board (iii) Consumer control unit (iv) Twin fluorescent tube **(4mks)**

(ii) Draw circuit diagrams of the following (i) 6 lamps 4 each controlled by one way switch independently, the other 2 lamps controlled by a one way switch **(3mks)**

(ii) 5 lamps controlled from 4 independent positions by two way and intermediate switches **(3mks)**

(b)(i) A domestic installation is to be wired using PVC sheathed twin and earth cable, consisting of the following final sub circuits

(1) 8 security lights rated at 200W controlled from 4 different position independently, 4 lights controlled from 2 different positions (2) Instant water heater Rated at 4KW (3) An electric cooker rated at 15KW plus a socket outlet on the cooker control unit (4) 6 13A socket outlets 4 connected in ring and one a spur, the floor area is 95Msquared

- (i) State the number of final sub circuits required **(1mks)**
- (ii) State the number of way of consumer control unit required **(1mks)**
- (iii) Determine the fuse rating and cable size of each final sub circuit
- (iv) Draw the wiring schedule for the installation **(13mks)**
- (C) (i) Describe what assumptions are made during application of diversity **(2mks)**
- (ii) Describe the effect of diversity application during installation design **(3mks)**

Question TWO

- (a) An installation consists of the following final sub circuits, four lighting points controlled from five different positions including a one way master switch, 4 socket outlets 3 connected in ring and one a spur, a cooker control unit and water heater unit, all done in PVC class B conduit wiring system.
- (i) List the material required for this installation **(3mks)**
 - (II) Draw the circuit of the system indicating the fuse and cable rating of each final sub circuit **(5mks)**
 - (III) State the sequence of carrying out the installation **(2mks)**
 - (b) Draw circuit diagrams of the circuits
 - (i) Total of 5 socket outlets 4 socket outlets in ring, one spur **(3mks)**
 - (ii) Total 4 socket outlets 3 in radial, one a spur **(3mks)**
 - (iii) 6 lamps controlled by three two way switches A, B, and C. B acts as a slave of A and C, at one point it switches three lamps, at the other point it switches the other three lamps **(4mks)**

Question THREE

- (a)(i)** State any FOUR types of final sub circuits **(4mks)**
- (ii) With aid of sketch illustrate THREE methods of connecting final sub circuits to the distribution boards **(3mks)**
- (iii) With aid of a sketch illustrate final sub circuits rated at over 15A **(3mks)**
- (b)(i)** State the first FOUR steps of installation design **(4mks)**
- (ii) Draw a circuit for sequence of control of at the intake point of 3phase installation **(3mks)**
- (iii) Draw a circuit diagram of sequence of control at the intake point of single phase installation **(3mks)**

Question FOUR

(a) Describe any TWO factors to be considered during each of the following stages of steel conduit work

(i) Installing conduits (ii) Marking out (iii) Preparing the conduits **(6mks)**

(iii) Describe the process of threading steel conduit **(4mks)**

(b) With aid of detailed circuit diagrams describe the following

(i) Typical small factory wiring **(3mks)**

(ii) Power distribution to consumers on 11KV/415 system using PME system **(4mks)**

(iii) Sequence of control in a factory **(3mks)**

Question FIVE

(a) (i) State THREE precautions to be taken during soldering **(3mks)**

(ii) Describe the process of tinning **(3mks)**

(iii) Describe the soldering procedure and how to evaluate a good soldered joint **(4mks)**

(b) A project on common emitter amplifier is to be mounted on a PCB board

(i) List the components needed to complete the task **(3mks)**

(ii) List the material and tools needed to complete the task **(2mks)**

(iii) State how you will prepare the work piece for this project **(3mks)**

(V) State the testing methods to be used **(2mks)**