



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIVERSITY ORDINARY EXAMINATION

2023/2024 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATION DIPLOMA IN

ELECTRICAL AND ELECTRONICS ENGINEERING – LEVEL 6

ENG/CU/PO/CR/07/6: SOLAR SYSTEM INSTALATION

DURATION: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Answer Question one and any other two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

- a) Define the electrical solar system (2 marks)
- b) State the four components of the solar power systems (4 marks)
- c) There are three solar panel sizes; state the three typical sizes of the solar panel. (3 marks)
- d) Regardless of a solar panel size there are other factors that significantly affect the solar panel's energy capabilities of the solar panel. (4 marks)
- e) There are distinct types of solar panels. State two types of solar panels (2 marks)
- f) Which type of solar panel are the best in terms of efficiency? Why are they regarded as the best type of solar panels? (2 marks)
- g) What direction should solar panels face? What is the correct tilt of the solar panels? (2 marks)
- h) Distinguish between solar irradiance and solar irradiation. (2 marks)
- i) State four application areas of a solar PV. (2 marks)
- j) State two major safety hazards in solar PV installation work. (2 marks)
- k) What is the major element found in a photovoltaic (PV) cell? (1 mark)
- l) What is the purpose of an inverter in an active solar system? Discuss (2 marks)
- m) Discuss as four main elements that makes up a solar PV module (2 marks)

SECTION TWO: ANSWER ANY TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) Discuss the three types of solar PV cabling. (6 marks)
- b) Distinguish between cable lugging and cable connectors
 - i. Why are lugs used at cable termination?
 - ii. What is the function of cable connectors? (6 marks)
- c) Define electrical test. Discuss four types of test in the solar system installation. (8 marks)

QUESTION THREE (20 MARKS)

- a) Discuss three functions of the consumers' main switch gear. (6 marks)
- b) Outline four solar PV laying tools and give the functions of each. (8 marks)
- c) Outline the best ways of configuring the following cable structures for the best efficient power generation (6 marks)
 - i. Medium Voltage
 - ii. Low Voltage
 - iii. Modules

QUESTION FOUR (20 MARKS)

- a) Discuss the three types of charge controllers in the solar system. (6 marks)
- b) What are the three advantages and two disadvantages of wiring solar panels in series and parallel? (10 marks)
- c) When should one use a series and parallel connection in wiring solar panels? (4 marks)