



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

Department of Mechanical Engineering

UNIVERSITY EXAMINATION FOR:

Diploma in Mechanical and Automotive Engineering (Plant Option)

EPL 2222: Plant Electrical and Instrumentation 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; Attempt any **THREE** Questions.

Do not write on the question paper.

QUESTION ONE

- (a) (i) Define the term wiring system
- (ii) Explain two factors considered when selecting a particular wiring system **(6 marks)**
- (b) Draw a labeled diagram of a 6-way consumer unit and indicate the ratings and cable sizes of the following final circuits.
 - (i) Lighting circuit
 - (ii) Ring circuit
 - (iii) Water heater
 - (iv) Cooker unit**(8 marks)**
- (c) With the aid of a circuit diagram describe the procedure for carrying out a polarity test on a dead circuit. **(6 marks)**

QUESTION TWO

- (a) (i) State two advantages of the grid system **(2 marks)**
- (ii) Draw the preferred graphical symbols for the following:
 - Lighting point
 - Single Socket outlet
 - Consumer control unit
 - Alarm**(4 marks)**
- (b) With the aid of a labeled diagram explain how a hydro-electric power station operates **(8 marks)**
- (c) Draw a labeled circuit diagram of the power distribution system
 - (i) DC three wire
 - (ii) AC three phase- 4 wire system**(6 marks)**

QUESTION THREE

- a) Define the following
- i) Instrumentation
 - ii) Sensor
 - iii) Measurand
 - iv) Linearity
 - v) Transducer
- (5 Marks)**
- b) i) State and explain any **three** factors that influence the choice of transducers.
ii) Explain with the aid of a block diagram the generalized measurement system
- (12 Marks)**
- iii) List any **three** methods of classifying transducers
- (3 Marks)**

QUESTION FOUR

- a) i) State the working principle of the following
- I) Resistance Strain Gauge
 - II) Proximity Inductance Type
 - III) Potentiometer Type
- ii) List any **two** advantages and **two** disadvantages of electrical transducers
- (10 Marks)**
- i) Distinguish between 'Active Transducer' and 'Passive Transducer'
- ii) Explain with the aid of diagrams the working principle of the Position b(i)
- (10 Marks)**

QUESTION FIVE

- a) With the of sketches briefly describe the following types of electrical pressure transducers
- I. LVDT-type electrical pressure transducer
 - II. Strain Gauge Pressure Sensor
- (10 Marks)**
- b) Describe with aid a diagram, describe the construction and working of
- I. Ring Balance Manometer
 - II. C - type Bourdon Tube Pressure
- (10 Marks)**