

PAPER 1



TECHNICAL

MOMBASA

UNIVERSITY OF

School of Engineering & Technology

Department of Electrical & Electronics

UNIVERSITY EXAMINATION FOR:

Diploma in Electrical and Electronic Engineering

ECI 2203 MEASUREMENT TECHNOLOGY II

END OF SEMESTER EXAMINATION

SERIES: MAY 2025

TIME: Two HOURS

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID, Scientific Calculator & No Mobile Phone.

This paper consists of five questions. Attempt any THREE questions.

Maximum marks for each part of a question are as shown.

This paper consists of TWO printed pages

Do not write on the question paper.

QUESTION ONE

- (a) (i) Briefly explain the operational principle of gas thermometers
(4mks)

(ii) A gas in a closed volume has a pressure of 120 psi at a temperature of 20°C. What will the pressure be at 100°C?
(4mks)

(b) State at least four tasks inclusive of thermocouple signal conditioning
(8mks)

(ii) With aid of a diagram describe our lead circuit resistance temperature detector (RTD)
(8mks)

QUESTION TWO

(a) (i) State the three types of temperature scales used (3mks)

(ii) Define the term heat, and explain briefly the three basic ways of heat transfer (8mks)

(b) (i) State five fundamental types into which filled system thermometer instruments may be separated (4mks)

(ii) With aid of a diagram describe a simple thermocouple transducers (5mks)

QUESTION THREE

(a) (i) State the four flow measuring systems groupings (4mks)

(ii) State and elaborate on four errors in theoretical performance of differential pressure measuring devices (10mks)

(b) With aid of a diagram describe the “corner” type orifice plate form of differential pressure flow measuring device (6mks)

QUESTION FOUR

(a) (i) Explain a thermistor and state what is of primary concern when a thermistor is used as a temperature sensing device (3mks)

(ii) State at least five limitations of thermistors (10mks)

(b) The lens of an optical pyrometer is clouded so that the transmission factor is 0.8. The instrument indicates a temperature of 1480°C. What is the true temperature? (4mks)

(ii) Describe vapour pressure thermometer and show rough sketch of methylchloride vapor pressure vs. Temperature curve (3mks)

QUESTION FIVE

(a) (i) Broadly, state the three groups of primary differential pressure flow measuring devices (3mks)

- (ii) With aid of a diagram explain why turbine flowmeter is known as inferential meter and write short notes on it (6mks)
- (b)(i) state and explain at least four limitations of flow measurement devices (8mks)
- (ii) Describe the principle on which the optical pyrometer works (3mks)