



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

Department of Electrical and Electronic Engineering

UNIVERSITY EXAMINATION FOR:

Diploma in Instrumentation and Control Engineering

ECI 2304: Computer Control Systems

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 following:

- I) Computing device
- II) Pilot light
- III) Transmitter

ii) In a compound control system, the ratio between variable is maintained at 3.5 to 1. If each has been converted to a 0-10V range signal, devise a signal-conditioning system that will output a zero signal to the controller when the ratio is correct.

(8 Marks)

b) i) With the aid of a sketch describe a compound variable control system in more which more than one processes variables are measured and used to control a single variable.

ii) Describe using suitable illustrations describe the following methods of controls

- I) Level control through direct flow control
- II) Level control through cascaded flow

(12Marks)

QUESTION TWO

a) i) With the aid of a block diagram, describe a smart sensor encasing a computer-based controller with the sensor

ii) State any **THREE** areas of application of modern Computer Control.

(10 Marks)

- b) i) Define “Data Logger”
 ii) Describe the major functional units of the system in (i)
 iii) State any three advantages of the system in (i) **(10 Marks)**

QUESTION THREE

- a) i) Figure 1.0 shows a temperature control system

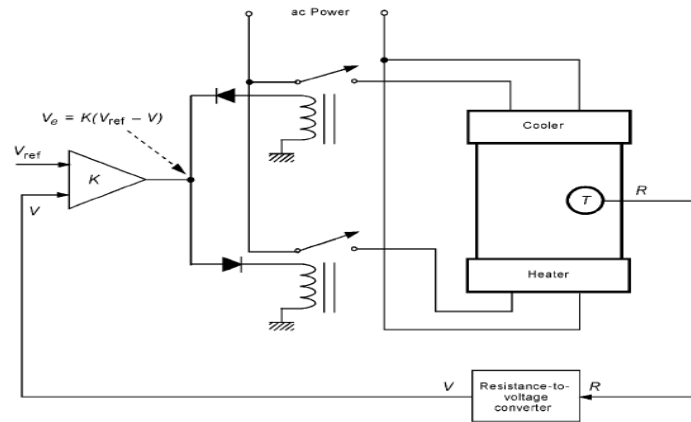


Fig. 1.0 Temperature control system

- I) Explain the operation
 II) Implement the process control loop using a computer
 III) Describe the role of the computer. **(8 Marks)**
- ii) Describe the following software formats for controllers
 I) Flowchart
 II) Machine Language
 III) Assembly Language
 IV) High-Level Language **(4 Marks)**
- iii) Draw the block diagram of a Single –board Computer (SBC) and explain the principal elements. **(8 Marks)**

QUESTION FOUR

- a) i) Define Supervisory Control
 ii) Distinguish between Distributed Control System (DCS) and Direct Digital Control (DDC).
 iv) Draw block diagrams for each of the systems in (ii) **(10 Marks)**
- b) i) Define **SCADA**
 ii) Describe any **five** major components units of the system in (i) **(10 Marks)**

QUESTION FIVE

- Q5 a) i) Define the following
 I) Data Modeling
 II) Relational Model
 III) Data Processing
 IV) Database
- ii) Explain any **three** properties of a relational database **(10 Marks)**
- b) i) Explain any Four types of database models
 ii) State any **two** advantages of b(i) **(10 Marks)**