MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONICS

UNIVERSITY ORDINARY EXAMINATION

2021/2022 ACADEMIC YEAR

THIRD YEAR **FIRST** SEMESTER EXAMINATION FOR, DIPLOMA IN ELECTRICAL AND ELECTRONICS

EEE 068: MICROCONTROLLERS SYSTEMS

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) Explain any **THREE** applications of microcontrollers. (6 marks)

b) Explain the following communication interfaces
   i) Serial
   ii) Parallel
(4 marks)

c) Explain the function of the following terms as applied in microcontrollers.
   i) Address bus
   ii) Data bus
   iii) Control bus (6 marks)

d) Explain the differences between the Von Neumann and Harvard microcontroller architectures. (4 marks)

e) Explain the working of the 8051 microcontroller internal counters/timers. (4 marks)

f) Explain the following addressing models giving an example for each.
   i) Immediate
   ii) Register
   iii) Indexed (6 marks)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION
QUESTION TWO (20 MARKS)

2. a) Explain any four ways in which microcontrollers are classified giving one example in each class. (12 marks)

b) Explain **ANY FOUR** differences between microprocessors and microcontrollers. (8 marks)

QUESTION THREE (20 MARKS)

4. a) With the aid of a diagram describe the basic architecture of the central processing unit of a microcontroller. (16 marks)

b) Distinguish between volatile and non-volatile memories. (4 marks)

QUESTION FOUR (20 MARKS)

4. Explain the following program development phases.
   i. Design phase
   ii. Implementation phase (4 marks)
b) With the aid of sketches, describe the following microcontroller architectures. (16 marks)
   i. Harvard
   ii. Von Neumann