



MURANG'A UNIVERSITY COLLEGE

(A Constituent College of Jomo Kenyatta University of Agriculture and Technology)

DEPARTMENT: ELECTRICAL ENGINEERING

MAIN EXAMINATION

LEVEL: DIPLOMA
CLASS: EE/P/14DJ
SEMESTER: I
YEAR: 3
ACADEMIC YEAR: 2015/2016
UNIT: MICROCONTROLLERS TECHNOLOGY
UNIT CODE: SEE 1305
DATE: 10TH DECEMBER 2015 **TIME: 2 HOURS**

Instructions to candidates

This paper contains TWO sections. Section A and B.

Attempt question ONE in section A and any other TWO questions from section B

You should have the following for this examination;

- Drawing instruments
- Scientific calculator

EXAMS: MAIN (DEC. 2015)

Mobile phone not allowed in examinations rooms

SECTION A

QUESTION 1

- a) Define the following communication interfaces
 - i. Serial
 - ii. Parallel (4 Marks)
- b) Explain any THREE applications of microcontrollers (6 Marks)
- c) Highlight the functions of the following terms as used in microcontrollers.
 - (i). Address bus
 - (ii). Data bus
 - (iii). Control bus (6marks)
- d) Distinguish 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 following addressing modes giving an example for each
 - (i). immediate
 - (ii). register
 - (iii). Indexed (6 marks)

SECTION B

QUESTION 2

- a) Describe the procedure of assembling and running programme for an 8051 microcontroller (8 marks)
- b) Explain any THREE differences between microprocessors and microcontrollers (6 marks)
- c) Explain the following program development phases
 - i. Design phase
 - ii. Implementation phase
 - iii. Testing and debugging phase (6 marks)

QUESTION 3

- a) Distinguish between volatile and non-volatile memories (4 marks)
- b) With the help of a diagram describe the basic architecture of the central processing unit of a microcontroller (16 marks)

QUESTION 4

- a) Distinguish between external memory microcontrollers and embedded microcontrollers (4 marks)
- b) Explain any THREE ways in which microcontrollers are classified giving any TWO examples in each class (8 marks)
- c) Explain any TWO differences between EPROM and EEPROM (4 marks)
- d) Distinguish between the following registers as used in microcontrollers
 - (i). Dedicated
 - (ii). General purpose (4 marks)