



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATIONS FOR DIPLOMA IN TECHNOLOGY (ELECTRICAL &
ELECTRONIC ENGINEERING)

EEE 2303

MICROCONTROLLER SYSTEMS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Sep 2018

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) explain the functions of the following microcontroller registers:
- i. TRISA
 - ii. TRISB
 - iii. STATUS
 - iv. OPTION
 - v. INTCON
- (b) Distinguish the functions of the PCLATH and the PCL registers
- (c) Write instructions to configure the following ports:
- i. PORTB as output
 - ii. PORTA as input

(10 marks)

(4 marks)

(6 marks)

QUESTION TWO

- (a) An LED is connected to **RA0** of PORTA of the PIC16F84A microcontroller and a program is required to cause the LED to flash ON and OFF continuously once the circuit is powered.
- i. Draw the circuit
 - ii. Write the program
- (a) Explain the process of writing a program into the microcontroller chip

(12 marks)

(8 marks)

QUESTION THREE

- (a) Explain the following types of microcontrollers and give ONE application for each type
- i. External memory microcontrollers
 - ii. Embedded microcontrollers
 - iii. RISC
 - iv. CISC
- (b) Draw the architecture of a microcontroller and explain the function of each block.(10 marks)

(10 marks)

QUESTION FOUR

- (a) State FIVE distinguishing factors between microcontrollers and microprocessors.(10 marks)
- (b) Explain the operation in each of the following instructions:
- i. DECFSZ PORTB, 1
 - ii. BTSS PORTA, 2
 - iii. ANDLW PORTB
- (c) Use a table to show the configurations of the prescaler

(6 marks)

(4 marks)

QUESTION FIVE

- (b) 8 LEDs are connected to PORTB of the PIC16F84A microcontroller to implement a running light back and forth.
- i. Draw the circuit
 - ii. Write the program
- (c) Explain THREE reasons for interfacing in microcontroller based projects

(14 marks)

(6 marks)