TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology in Conjunction with Kenya Institute of Highways and Building & Technology (KIHBT)

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

HIGHER DIPLOMA IN TECHNOLOGY

EEE 3104: MICROCONTROLLERS

END OF SEMESTER EXAMINATION
SERIES: MAY 2015
TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Drawing Instruments*
- *Non-Programmable Calculator*

This paper consists of **FIVE** questions. Answer any **THREE** questions
All questions carry equal marks
Use neat, large and well labeled diagrams where required
This paper consists of **THREE** printed pages

Question One

a) (i) State any THREE applications of microcontrollers.
(ii) Explain the function of the prescaler and use a table to illustrate its configurations **(8 marks)**

b) Explain the functions of the following: **(8 marks)**
(i) W register
(ii) OPTION
(iii) INTCON

c) Explain the following instructions:
(i) DECFSZ COUNT, 1
(ii) CALL
(iii) RETURN

Question Two

a) (i) Explain the functions of a macro
(ii) Write instructions to name and end a macro **(6 marks)**

b) An LED connected to pin RA of the PIC microcontroller, flashes ON and OFF continuously
(i) Draw the circuit
(ii) Write the program **(14 marks)**

Question Three

a) (i) State and explain any TWO types of multitasking
(ii) Distinguish between variables and interrupts **(8 marks)**

b) Write instructions for each of the following:
(i) Configure part A as input and port B as output
(ii) Rotate contents of PORT B left and the results stored in PORT B **(8 marks)**

c) Draw the block diagram of the microcontroller architecture and show the interconnections between the blocks **(4 marks)**

Question Four

a) Explain the following terms:
(i) Relocatable code
(ii) Re-usable code
(iii) Absolute code
(iv) Assembler directives **(8 marks)**

b) Five LEDS are connected to PORTA of the PIC16F84A microntroller so as to implement a running light.
(i) Draw the circuit
(ii) Write the program **(12 marks)**

Question Five

a) Explain any FOUR distinctive features between microcontrollers and microprocessors **(8 marks)**

b) Describe how a microcontroller can be programmed and give the software and hardware tools to be used **(8 marks)**

c) Explain the functions of the following registers **(4 marks)**

(i) STATUS

(ii) TRISB **(4 marks)**