## UNIVERSITY OF SWAZILAND MAIN EXAMINATION 2012

### FACULTY OF SCIENCE

#### DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

TITLE OF PAPER : MICROCONTROLLERS AND MICROCOMPUTER SYSTEMS

COURSE NUMBER : EE423

TIME ALLOWED : THREE HOURS

#### INSTRUCTIONS

- 1. Read each of the FIVE questions carefully
- 2. Answer any FOUR questions.
- 3. Each question carries **25 marks**
- 4. Marks for each section are shown on the right-hand margin

#### THIS PAPER HAS SIX PAGES INCLUDING THIS PAGE.

# THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GIVEN BY THE INVIGILATOR.

1

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(a) Using neat block diagrams, explain the difference between a general purpose Microprocessor and a Microcontroller?

[8 marks]

(b) With the aid of appropriate illustrations, explain the Von Neumann and the Harvard architectures. Which architecture is used in PIC microcontrollers?

[10 marks]

(c) Discuss the memory organization in PIC microcontrollers.

[7 marks]

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(a)	Which specific features of PIC microcontrollers made them popular? Explain your answer.				
			[8 marks]		
(b)	(i)	Draw the architecture of PIC 16C7X family.	[7 marks]		
	(ii)	Explain the different registers and memories used in laseries of microcontrollers.	PIC 16C7X		

[10 marks]

(a) With the aid of a diagram, discuss port structure and Pin configuration of PIC 16C74A.

4

[10 marks]

- (b) Write short notes on:
  - Byte oriented instructions
  - Bit oriented instructions
  - Literal instructions

[8 marks]

(c) Giving two examples, explain instruction encoding.

[7 marks]

(a)	(i)	What are the different timer modules used in PIC 16C7	74A? [2 marks]	
	(ii)	With the aid of neat diagrams, explain Timer-0 operation prescaler and without a prescaler .	on, with a	
			[8 marks]	
(b)	Exp	Explain Interrupt logic used in the PIC 16C74A and draw a schema		
	alag	This showing the interrupt logic for PIC.	[5 marks]	
(c)	(i)	Discuss capture / compare modules.		
			[6 marks]	
	(ii)	With the aid of a schematic diagram explain the capture operation and give the required conditions for capture operation.	re mode of mode	
		·	[4 marks]	

*,* 5

(a) ]	Discu termir	iss Assembly Language format and define some widely un nology associated with Assembly language programming	ised [10 marks
(b)	(i) (ii)	What is an Assembler directive? List the MPASM Assembler directives.	[2 marks] [3 marks]
(c)	(i)	Discuss Synchronous Serial Port modules of PIC 16C7	4A. [4 marks]
	(ii)	Explain, using a schematic diagram, the Serial Peripher (SPI).	ral Interface [6 marks]

6