

**KABARAK**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**2010/2011 ACADEMIC YEAR**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION  
TECHNOLOGY**

**COURSE CODE: INTE 123**

**COURSE TITLE: COMPUTER ORGANIZATION &  
ARCHITECTURE**

**STREAM: Y1S2**

**DAY: WEDNESDAY**

**TIME: 2.00 – 5.00 P.M.**

**DATE: 23/03/2011**

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**INSTRUCTIONS:**

- Answer ALL Questions in Section A
- Answer any Three Questions from Section B

**PLEASE TURN OVER**

## SECTION A (40 MARKS)

1. Explain the difference between computer architecture, design and organization  
(3 marks)
2. Differentiate between Assembly language and machine language  
(4 marks)
3. Explain with a diagram the functions of the following as used in a digital computer
  - i. Control unit
  - ii. ALU
  - iii. Input/output unit  
(6 marks)
4. Describe the differences between the following
  - i. Binary and decimal number systems
  - ii. Hexadecimal and octal number systems  
(4 marks)
5. Explain the following using the truth table and logic diagram
  - i. Half adder
  - ii. Full adder  
(4 marks)
6. Define sequential circuits  
(2 marks)
7. Draw the logic diagram and the truth table of the following  
 $F = x + y'z$   
(3 marks)
8. Differentiate between immediate addressing and register addressing giving examples  
(3 marks)
9. Define a Flip flop and its uses`  
(2 marks)
10. Differentiate between shift registers and registers  
(4 marks)
11. Explain about I/O versus memory bus and memory mapped I/O  
(4 marks)
12. What does the CMA instruction do?  
(1 mark)

## SECTION B

Answer any Three

There are four questions

Each question carries 20 marks

### QUESTION TWO (20 MARKS)

1. Perform the following conversions
  - i.  $155_{10}$  to binary
  - ii.  $1011.1010_2$  to decimal
  - iii.  $10111001_2$  to decimal
  - iv.  $151_{10}$  to hexadecimal
  - v.  $11101_2$  to octal  
(5 marks)

2. Describe the functions of the following
  - i. Encoder
  - ii. Decoder
  - iii. Multiplexer

**(6 marks)**
  
3. Simplify the following Boolean algebra and draw a logic diagram and a truth table to solve it.
 
$$F=ABC+ABC'+A'C$$

**(6 marks)**
  
4. Explain the operations performed in a stack
 

**( 3 marks)**

### **QUESTION THREE (20 MARKS)**

1. State the difference between Asynchronous and synchronous circuits **(2 marks)**
2. What are addressing modes? **(1 mark)**
3. Explain various addressing modes **(6 marks)**
4. State the functions of the following memories
  - i. ROM
  - ii. RAM

**(4 marks)**
5. Write an ALP to perform addition of 2 8-bit numbers **(4 marks)**
6. Explain 3 data transfer instructions **(3 marks)**

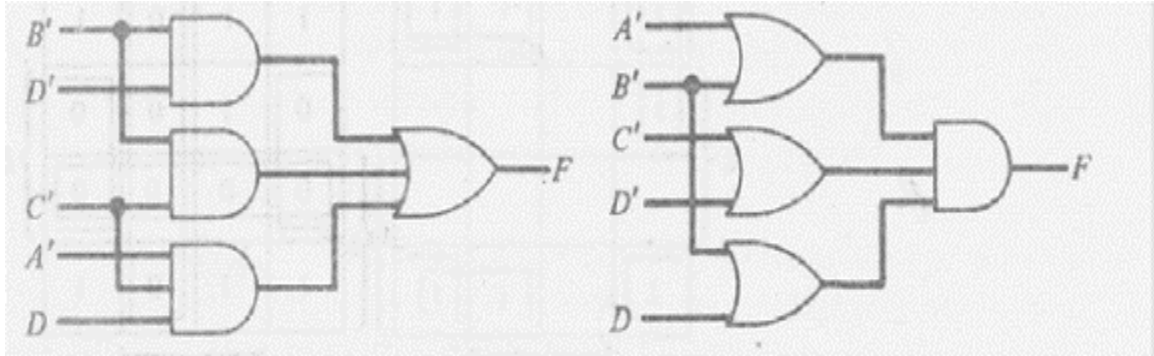
### **QUESTION FOUR (20 MARKS)**

1. Define handshaking **(1 mark)**
2. Explain types of interrupts **(4 marks)**
3. Explain about Direct Memory Access **(4 marks)**
4. Explain what happens to the stack pointer when push and pop are applied to the stack **(4 marks)**
5. Explain the functions of the following
  - i. Binary counters
  - ii. Strobe control
  - iii. Asynchronous serial transfer

**(6 marks)**
6. Explain priority interrupt **(1 mark)**

### QUESTION FIVE (20 MARKS)

1. The following logic diagram represents AND and OR gates respectively.  
Generate a Boolean algebra for the sum of products for AND gate and product of sums for the OR gate respectively.



2. Explain the daisy chaining priority and parallel priority interrupt (4 marks)
3. Explain the CPU-IOP communication (2 marks)
4. Using two address instructions write a program to evaluate the following expression (4 marks)  
$$X = (A+B) * (C+D)$$
5. Explain about the input output organization (6 marks)