Printed Pages : 3 ECS401

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0110 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. IV) THEORY EXAMINATION 2010-11

COMPUTER ORGANIZATION

Time : 3 Hours *Total Marks : 100*

Note :— Attempt **ALL** questions. Each carries equal marks.

1. Attempt any **four** parts :— **(5×4=20)**

(a) Perform the arithmetic operations (+ 46) + (– 23) and (– 46) – (– 23) in binary using signed 2's complement representation for negative numbers.

(b) Differentiate between BCD and XS-3 Codes. Perform the following operations using XS-3 Codes :

(i) $(544)_{10} + (278)_{10}$

(ii) $(193)_{10} - (47)_{10}$.

(c) Show the bit configuration of a 24-bit register. When its content represents the decimal equivalent of 195 :

(i) in binary

(ii) in BCD

(iii) in ASCII

using 8-bit with even parity.

(d) Describe the role of buses in any system. For which purpose they are used ? Explain different types of buses with suitable examples

(e) Define the significance of Hamming code with example.

2. Attempt any **four** parts :— **(5×4=20)**

(a) Simplify the Boolean function in sum-of-product form by means of a four variable map. Draw the logic diagram with NAND gate.

$$F(A, B, C, D) = \Sigma(0, 2, 8, 9, 10, 11, 14, 15)$$

(b) Explain decoders. Draw the block diagram of 2 to 4 line decoder with NAND gate. Also show its truth table.

(c) Discuss the role of Registers in processing of data. Make and explain 4-bit shift register with its working.

(d) What is ROM ? How does PROM differ from EEPROM ?

(e) Show that J-K flip-flop can be converted to a D-flip-flop with an inverter between the J & K inputs.

3. Attempt any **two** parts :— **(10×2=20)**

(a) What is the role of Instruction Register (IR) ? Write the steps used to execute IR and also discuss the operations performed by IR.

(b) Explain the microprogrammed control with its basic organization. Write the microroutine for the instruction branch < 0.

(c) Why is wait-for-memory-function-completed steps needed when reading from or writing from main memory ?

4. Attempt any **two** parts :— **(10×2=20)**

(a) What is Cache memory ? Explain it with its basic characteristics. How Associative mapping and Direct mapping is considered in the organization of Cache memory.

(b) An address space is specified by 24 bits and corresponding memory space by 16 bits :

(i) How many words are there in the address space ?

(ii) How many words are there in the memory space ?

(iii) If a page consists of 2 K words, how many pages and blocks are there in the system ?

(c) What do you mean by memory management hardware ? Explain the basic components of memory management unit.

5. Attempt any **two** parts :— **(10×2=20)**

(a) Describe asynchronous data transfer. What are the methods through which it can be achieved ? Explain Stroke control and Handshaking.

(b) What do you mean by modes of transfer ? Explain the following :

(i) Programmed I/O

(ii) Interrupt Initiated I/O.

(c) What are the various standard communication interfaces ? Explain with the help of synchronous communication.