ALCCS – OLD SCHEME

Code: CS12   **Subject: COMPUTER ARCHITECTURE**
Time: 3 Hours   **Max. Marks: 100**

AUGUST 2011

NOTE:
* **Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.**
* **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
* **Parts of a question should be answered at the same place.**

Q.1 a. Give equivalent decimal value for a binary fractional number 101.101.

   b. What is memory locality? Define two types of locality that memories take advantage of?

   c. Differentiate between machine instructions and micro-instructions.

   d. Show diagrammatically implementation of EX-OR and EX-NOR through NAND function.

   e. A certain memory has a capacity of $4K \times 8$
   (i)   How many data input and data output lines does it have?
   (ii) How many address lines does it have?
   (iii) What is its capacity in bytes?

   f. Distinguish between combinational logic circuits and sequential logic circuits.

   g. What do you mean by Instruction Set Completeness? Give the types of instructions to be included in a Instruction Set.   **(7×4)**

Q.2 a. What does a priority encoder mean? Name the 7400 series TTL chip which is a 8-to-3 bit priority encoder. Explain its working using its truth table and a block diagram.   **(9)**

   b. What is a digital multiplexer? Illustrate its functional diagram. Realise 4-to-1 multiplexer using (i) Decoder, AND and OR gate (ii) 3-state buffers and AND gate. **(9)**

Q.3 a. Where should a block be placed in the cache? Which block frame in the cache should be replaced upon a miss? Explain.   **(12)**

   b. Simplify the expression $F = \sum (0,1,4,8,10,11,12) + d(2,3,6,9,15)$. Realise the simplified expression using logic gates.   **(6)**

Q.4 a. What is circular right shift and arithmetic right shift? Explain by an example.   **(5)**

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b. Implement the logic expression given below, using 8-input multiplexer:
Y = Ó (1, 2, 4, 7, 8, 9, 13). **(8)**

c. Multiply 3 with -7 using 4 bit booths algorithm. **(5)**

Q.5 a. What is meant by DMA? How DMA controller works? Explain with suitable block diagram. **(6)**

b. Write a brief note on vectored interrupt. **(6)**

c. Draw a clean flowchart of floating point division carried out in a computer. **(6)**

Q.6 a. What does Addressing Mode mean? Explain at least five different Addressing Modes with an example. **(6)**

b. With neat block diagram, explain the working principle of micro program sequencer. **(6)**

c. Compare and contrast Memory mapped I/O and I/O mapped I/O. **(6)**

Q.7 Write notes on any **THREE** of following:

(i)   Virtual Memory
(ii) Characteristics of RISC processor
(iii) Polling in I/O subsystem design
(iv) Synchronous & Asynchronous type data transfer. **(6×3)**