

ALCCS

Time: 3 Hours

FEBRUARY 2014

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- **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. Explain the role of timing and control used in the design of computer organization.
- b. Compare isolated I/O and memory-mapped I/O.
- c. Explain delayed load and delayed branch in RISC pipeline operations.
- d. Explain memory interleaving. Give its respective advantages.
- e. Give any two examples for each of the following:
- (i) Arithmetic microoperations
 - (ii) Logic microoperations
- f. Explain priority interrupt. Mention the role of polling in priority interrupt.
- g. Explain fixed-point data representation and floating-point data representation used in digital systems. Give an example with illustration. (7×4)
- Q.2** a. Explain the metrics used in the performance of a computer. (5)
- b. Draw the flow chart of first pass assembler and second pass assembler. Explain its working mechanism. (8)
- c. Explain how stacks are used in subroutines. Give an example with illustration. (5)
- Q.3** a. What is the significance of the addressing modes? Explain the following addressing modes with an example: (6)
- (i) Implied mode
 - (ii) Register Indirect Mode
 - (iii) Indirect Address Mode
- b. Explain the organization of register stack and memory stack. (6)
- c. Explain register transfer logic. Give an example to illustrate bus and memory transfer operations. (6)

- Q.4** a. Explain the working of microprogram sequencer. Draw the respective block diagram. (4+3)
- b. Explain horizontal microinstruction and vertical microinstruction. (6)
- c. Show how a 9-bit microoperation field in a microinstruction can be divided into subfields to specify 46 microoperations. How many microoperations can be specified in one microinstruction? (5)

- Q.5** a. Describe various types of auxiliary memory used in digital systems. (5)
- b. Explain segmented-page mapping. (4)
- c. Write short notes for each for the following: (9)
- (i) Associative mapping
 - (ii) Direct mapping
 - (iii) Set-associative mapping

- Q.6** a. Explain DMA based data transfer. Give the respective block diagram. (6)
- b. Give at least six status conditions for the setting of individual bits in the status register of an asynchronous communication interface. (6)
- c. A virtual memory has a page size of 1K words. There are eight pages and four blocks. The associative memory page table contains the following entries: (6)

Page	Block
0	3
1	1
4	2
6	0

Make a list of all virtual addresses (in decimal) that will cause a page fault if used by the CPU.

- Q.7** a. Explain the characteristics of CISC and RISC architectures. (6)
- b. Explain the following: (6)
- (i) Pipeline processing
 - (ii) Vector processing
 - (iii) Array processors
- c. Explain briefly Superscalar and Superpipelined architectures. (2×3)