

J—2235/015

M.C.A. EXAMINATION

May 2001

(Second Semester)

MCA 204

COMPUTER ORGANISATION AND ARCHITECTURE

Time : 3 Hours

Maximum Marks : 80

Note : Attempt any *Five* questions. All questions carry equal marks.

1. (a) Draw functional block diagram of a digital computer and explain it in brief. 5

(b) Why subroutines are required in a program? How does subroutine branching and return to main program take place? 5

(c) What is addressing modes? Explain the following addressing models:

(i) Immediate Address Mode

(ii) Register Indirect Mode

(iii) Relative Address Mode. 6

2 (a) Write program to evaluate the arithmetic statement:

$$2235/015 = \frac{1}{3} \quad (151)$$

$$2235/015 = \frac{2}{3}$$

$$X = \frac{A - B + C * (D * E - F)}{G + H * K}$$

- (i) Using a general register computer with 3 address instructions.
- (ii) Using an accumulator type computer with one address instructions. 8
- (b) Draw the flowchart for instruction cycle and explain it.
3. (a) Explain the concept of microprogrammed control. Differentiate between hardwired and microprogrammed control. 8
- (b) Explain the microprogram sequencer. 8
4. (a) Explain the concept of Virtual Memory and write about page fault and page replacement algorithms.
- (b) A computer employs RAM chips of 256 x 8 and ROM chips of 1024 x 8. The computer system needs 2K Bytes of RAM and 4K bytes of ROM and four interface units, each with 4 registers. A memory mapped I/O configuration is used. The two highest order bits of the address bus are assigned 00 for RAM, 01 for

ROM, and 10 for interface registers.

- (i) How many RAM and ROM chips are needed?
- (ii) Draw a memory address map for the system.
- (iii) Give the address range in Hexadecimal for RAM, ROM and Interface. 8.

5. (a) What is memory address map? Explain how main memory are connected to a CPU through the data and address bus. 5

(b) How interleaved memory is useful in multiprocessor system?

(c) The access time of a CACHE memory is 100 ns and that of main memory 1000 ns. It is estimated that 80% of the memory requests are for read and remaining 20% for write. The bit ratio for read accesses only is 0.9. A write through procedure is used.

(i) What is the average access time of the system considering only memory read cycles?

(ii) What is the average access time of the

$$7235 / 015 = 3 \quad (153)$$