

Total No. of printed pages = 4

3 (Sem 3) CSC M2

2015

COMPUTER SCIENCE

(Major)

Paper : 3.2

(Computer Organization and Architecture)

Full Marks - 60

Time - Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : $1 \times 6 = 6$

(a) What is meant by straight line sequencing ?

(b) What is the difference between logical shift and arithmetic shift ?

(c) What is the purpose of a control memory ?

(d) What is a microprogram ?

[Turn over

(e) What is meant by interrupt ?

(f) What is ROM ?

2. Answer the following questions : $2 \times 5 = 10$

(a) What is normalized floating point representation ?

(b) Perform the arithmetic operation

$$-45 - (-12)$$

in binary using sign 2's complement representation.

(c) What is the need of status register ?

(d) What is the basic disadvantage of program control I/O ?

(e) List two differences between SRAM and DRAM.

3. Answer any *four* of the following questions :

$$5 \times 4 = 20$$

(a) What is addressing mode ? Define any four addressing modes.

(b) Explain the requirements of program counter and stack.

(c) What is conditional control statement ? Write the conditional control statement equivalent to the following two statements

$$\bar{C}T_2 : F \leftarrow 1$$

$$CT_2 : F \leftarrow 0$$

where C and F are 1 bit register and T_2 is timing variable.

(d) What are the advantages and disadvantages of Hardwired control and microprogram control ?

(e) Draw the block diagram of a micro-programmed computer.

(f) Explain two terms—

(i) Cache hit

(ii) Cache miss

4. Answer any *three* of the following questions :

$$8 \times 3 = 24$$

(a) Design an arithmetic circuit with two selection variables S_1 and S_0 , that generates the following arithmetic operations. Draw the logic diagram of one typical stage.

S_1	S_0	$C_{in} = 0$	$C_{in} = 1$
0	0	$F = A + B$	$F = A + B + 1$
0	1	$F = A$	$F = A + 1$
1	0	$F = \bar{B}$	$F = \bar{B} + 1$
1	1	$F = A + \bar{B}$	$F = A + \bar{B} + 1$

- (b) Derive an algorithm in flowchart form for multiplying floating point numbers.
- (c) Discuss any two schemes used to handle interrupts from multiple sources.
- (d) Illustrate the internal structure of a typical microprogram sequencer.
- (e) Specify the microoperations for an typical accumulator and design the associated logic of it.
- (f) Describe any two mapping procedure of cache memory.