Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2140707 **Date:03/06/2016**

Subject Name:Computer Organization

Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **Short Questions** **14**

1 Represent the following conditional control statement(s) by two register transfer statements with control function.

If (P = 1) then (R1← R2) else if (Q=1) then (R1←R3)

2 Which information is stored by Program Counter (PC)?

3 Define pseudo-instruction.

4 Give full form of CAR.

5 Enlist major components of CPU.

6 State any two solutions for handling branch difficulties.

7 State true or false:

With floating point numbers, the divide overflow imposes no problem(s).

8 Enlist possible modes of data transfer to and from peripherals.

9 Define hit ratio.

10 What is critical section?

11 Enlist any two examples of external interrupt.

12 What do you mean by speed-up in context of pipelining?

13 State true or false:

In binary number system, B – A is equivalent to B + $\bar{A}$ + 1.

14 What is page fault?

Q.2 **(a)** Design a digital circuit for 4-bit binary adder. **03**

(b) Write a sequence of microoperation(s) for the following memory reference instructions. **04**

1) ADD 2) BUN

(c) Write a program to evaluate the following arithmetic statement **07**

X= [A * (B + C) – D] / (E + F - G)

(i) using a general register computer with three-address instructions,

(ii) using an accumulator type computer with one-address instructions,

(iii) using a stack organized computer with zero-address operation instructions.

OR

(c) Draw and explain flowchart for interrupt cycle. **07**

Q.3 **(a)** For the following C language code , write assembly language program: **03**

```
int a, b, c;
a = 83;    // plus 83
b = -23;  //minus 23
c=a + b;
```

(b) Explain hardware implementation of common bus system using three- **04**

state buffers. Mention assumptions if required.

	(c)	List various types of addressing modes and explain any five of them.	**07**

OR

Q.3	**(a)**	State the differences between hardwired control and microprogrammed control.	**03**
	(b)	Draw and briefly explain flowchart for first pass of assembler.	**04**
	(c)	Elaborate 4-segment instruction pipeline with neat sketches.	**07**
Q.4	**(a)**	State the major characteristics of RISC processor.	**03**
	(b)	Write a brief note on microprogrammed control organization.	**04**
	(c)	Assume A = (+8) and B = (+5). Multiply these two numbers using Booth algorithm. Show the step-by-step multiplication process.	**07**

OR

Q.4	**(a)**	Draw space-time diagram for 4-segment pipeline with seven tasks.	**03**
	(b)	State the differences between register stack and memory stack.	**04**
	(c)	Draw and explain flowchart for addition and subtraction operations with sign-magnitude data.	**07**
Q.5	**(a)**	Briefly explain source initiated transfer using handshaking.	**03**
	(b)	Write a note on crossbar switch interconnection structure with block diagram.	**04**
	(c)	Write a short note on associative memory.	**07**

OR

Q.5	**(a)**	Discuss the differences between tightly-coupled multiprocessor and loosely-coupled multiprocessor.	**03**
	(b)	Explain daisy chain priority interrupt.	**04**
	(c)	What is virtual memory? Explain relation between address space and memory space in virtual memory system.	**07**

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