

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 ($R1 \leftarrow R2$) else if ($Q=1$) then ($R1 \leftarrow R3$)
 - 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
