Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS202

Course Name: COMPUTER ORGANISATION AND ARCHITECTURE (CS, IT)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions,each carries 3 marks

1		Explain one, two and three address instruction with an example for each.	3
2		List the steps involved in invoking a subroutine through the use of a link register.	3
3		Draw a 3 x 2 array multiplier.	3
4		Non-restoring division is faster than restoring division. Justify the statement.	3

PART B

Answer any two questions, each carries 9 marks

5		List various addressing modes explain any four with an example for each.	9
6	a)	Draw the diagram of a multi-bus organization with 3 buses. Write the control sequence for the instruction Add R4, R5, R6 for the above mentioned multi-bus organization.	5
	b)	Give the sequence of control steps required to perform the operation Add [R3], R1 in a single-bus organization.	4
7	a)	Divide $(1000)_2$ by $(11)_2$ using restoring division method.	4
	b)	Illustrate the basic operational concepts in transferring data between main memory and processor with neat diagram.	5

PART C

Answer all question, each carries 3 marks

8		What are vectored interrupts?	3
9		Give the functions of initiator and target controllers in SCSI bus.	3
10		Compare synchronous and asynchronous DRAM.	3
11		Define temporal locality and spatial locality.	3

PART D

Answer any two questions, each carries 9 marks

12	a)	Differentiate centralized and distributed bus arbitration mechanism used in DMA.	4
	b)	Give the structure of a typical static RAM cell and explain its read and write operations.	5

13 Differentiate serial port and parallel port. Draw the diagram of a bidirectional 8-bit parallel interface and explain its working. 9

14 Elaborate the various cache mapping techniques with an example for each. 9

PART E

Answer any four questions, each carries 10 marks

15 a) Write the Register Transfer Logic format for a conditional control statement. Give an example and explain the same. 4

b) Mention the advantages of using a scratch pad memory. Draw the diagram of a processor that employs a scratch pad memory and explain the same. 6

16 a) Design an adder/subtractor circuit with one selection variable s and two inputs A and B. When $s = 0$ the circuit performs $A + B$. When $s = 1$ the circuit performs $A - B$ by taking 2's complement of B. 5

b) Design a 4-bit combinational logic shifter with 2 control signals H_1 and H_0 that performs the following operations (bit values given in parenthesis are the values of control variables H_1 and H_0 respectively):- No shift (00), Shift-right (01), Shift-left (10), Transfer 0's to S (11). 5

17 a) Draw and explain the block diagram for a 4-bit complete accumulator 6

b) Discuss about condition code bits in a 4 bit status register 4

18 Design a hard-wired control unit based on the one flip-flop per state method to add/subtract 2 signed numbers represented in the sign-and-magnitude form. 10

19 Explain the organization of a microprogrammed computer with a block diagram 10

20 Draw a neat block diagram of a microprogram sequencer and explain its working. 10

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