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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree (S, FE) Examination January 2024 (2015 Scheme)

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		Write one address, two address, and three address representations for the below operation. X = [Y] * [Z]	3
2		Differentiate between big-endian and little-endian byte assignments.	3
3		Design a 3x2 array multiplier.	3
4		Divide 21/8 using non restoring algorithm.	3

PART B

Answer any two questions, each carries 9 marks

5	a)	Explain multiple bus organizations with the help of a diagram	6
	b)	Write notes on any three addressing modes of the ARM processor.	3
6	a)	Draw the flowchart of Booth's algorithm and use the algorithm to perform the multiplication of the following signed 2's-complement numbers. Assume that A is the multiplicand and B is the multiplier. i) A = 101011 and B = 010011	9
7	a)	Sketch and explain the working of the basic functional units of a Computer.	5
	b)	Using relevant examples explain stack frames, push operation, pop operation, and stack pointer	4

PART C

Answer all questions, each carries 3 marks

8		How does a processor respond when an interrupt is encountered?	3
9		List and describe the registers in a DMA interface.	3
10		With the help of a neat diagram explain the memory hierarchy in Computer.	3
11		What are the various types of ROM?	3

PART D

Answer any two questions, each carries 9 marks

12 a) Explain the different methods of bus arbitration. 5

b) Illustrate the operation of the Small Computer System Interface bus. 4

13 a) Write short notes on USB architecture and explain the working with the help of a neat diagram. 5

b) Give the structure of a typical static RAM cell and explain its read and write operations. 4

14 Explain the various types of Cache mapping techniques using suitable examples. 9

PART E

Answer any four questions, each carries 10 marks

15 a) With a neat diagram explain the working of a two-port scratchpad memory. 5

b) What are arithmetic, logic and shift microoperations. Give examples for each. 5

16 Discuss the different methods of control logic design in detail. 10

17 Design an arithmetic section with one selection variable S, Cin and two 4-bit inputs A and B. Draw the diagram for four stages that performs the following operations. 10

S	Cin =0	Cin =1
0	Y = Decrement A	Y= A-B
1	Y = A + B	Y = Increment A

When s=0, the circuit performs A+B and when s=1 it performs A-B, by taking 2's complement of B.

18 a) Illustrate the working of a status register. 6

b) Design a 4-bit combinational logic shifter. 4

19 Explain with the help of a diagram, the working of the microprogram sequencer 10

20 Draw a labelled block diagram of a processor unit with seven registers R1 to R7, a status register, ALU with 3-selection variables and Cin, and shifter with 3 selection variables. 10

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