

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Fourth Semester B.Tech Degree (S,FE) Examination August 2021 (2015 Scheme)

**Course Code: EC206****Course Name: COMPUTER ORGANISATION (EC)**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer any two full questions, each carries 15 marks*

Marks

- 1 a) Illustrate the basic functional units of a computer and list the functions of each unit. (6)
- b) Design and implement a 1-bit ALU that will perform the following arithmetic and logical operations. Only one adder should be used for both add (+) and sub (-) operation. (9)

F <sub>2:0</sub>	Function
100	NOT b
001	a AND b
010	a OR b
011	a + b
111	a - b

- 2 a) Explain the R-type and I-type instruction formats in MIPS with example. (5)
- b) Identify the type of instructions given. Also write the operation performed when each instruction is executed. (10)
- (a) add \$t1, \$s4, \$s5
- (b) addi \$t3, \$s3, -12
- (c) lw \$t0, 35(\$0)
- (d) sw \$s1, 9(\$t1)
- 3 a) Discuss about operands and registers of MIPS processor. (6)
- b) With examples, differentiate logical shifter, Arithmetic shifter and Rotator. (9)
- Design and Implement 4-bit logical shift right circuit.

**PART B**

*Answer any two full questions, each carries 15 marks*

- 4 a) Explain the five addressing modes of MIPS with example. (15)
- 5 a) Differentiate between single-cycle micro architecture and multi-cycle microarchitecture. (5)
- b) Draw the datapath for single cycle processor for *add* instruction. (10)
- 6 a) How does a multicycle processor address the three weaknesses of single-cycle processor? (7)
- b) With neat diagram explain MIPS Memory Map (8)

**PART C**

*Answer any two full questions, each carries 20 marks*

- 7 a) Describe the role of translation look aside buffer in address translation. (7)
- b) Explain why refreshing is essential in DRAM and not required in SRAM. (4)
- c) Describe programmed I/O and Interrupt driven I/O. (9)
- 8 a) Differentiate between the two write policies in cache memory. (5)
- b) Draw the memory hierarchy diagram. (5)
- c) Illustrate how data is found in a direct mapped cache. (10)
- 9 a) Explain the principle of cache memory and the terms used in cache memory (8)
- b) Draw the internal organization of a SRAM cell and explain the read and write operation. (7)
- c) Explain DMA data transfer method. (5)

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