

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CS202

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

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions. Each carries 3 marks.

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|---|--|---|
| 1 | Write the three-address, two-address and one-address representations of the operation below with relevant assumptions: | 3 |
| | $C \leftarrow [A] + [B]$ | |
| 2 | What is the use of linkage register in subroutine invocation? | 3 |
| 3 | Why is non-restoring division faster than restoring division? | 3 |
| 4 | Design and draw a 3X2 array multiplier. | 3 |

PART B

Answer any two questions. Each carries 9 marks.

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| 5 | Illustrate various addressing modes with proper examples. Which is the default addressing mode selected by assemblers and compilers and why? | 9 |
| 6 | Give the flow chart for Booth's Algorithm. Illustrate using an example. | 9 |
| 7 | (a) Assuming that stack grows towards lower address range write assembly code for the following (Without using PUSH and POP) : | 4.5 |
| | (i) Pushing elements stored at ITEM1, ITEM2 onto stack | |
| | (ii) Popping an element onto address ITEM | |
| | (iii) Copying value of top of stack to address TOP | |
| 7 | (b) Compare and contrast single bus and multiple bus organisation of CPU. | 4.5 |

PART C

Answer all questions. Each carries 3 marks.

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| 8 | Compare the two main modes of DMA transfer. | 3 |
| 9 | Explain any two interrupt priority schemes. | 3 |
| 10 | What is MFC signal? How is it related to Memory Access Time? | 3 |
| 11 | Which design feature of SRAM cells helps in value retention without refresh? | 3 |

PART D

Answer any two questions. Each carries 9 marks.

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|--------|---|-----|
| 12 | Illustrate with an example SCSI bus arbitration and selection. | 9 |
| 13 | With the help of a diagram examine the internal organisation of bit cells in a memory chip. | 9 |
| 14 (a) | Explain the architecture of USB with help of a diagram. | 4.5 |
| 14 (b) | Differentiate Direct and Associative mapped cache with examples. | 4.5 |

PART E

Answer any four questions. Each carries 10 marks.

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| 15 | Give a simple design for generating status bits for a 8-bit ALU. | 10 |
| 16 | Draw a labelled block diagram of a processor unit with seven registers R1 to R7, a status register, ALU with 3-selection variables and C_{in} , and shifter with 3 selection variables. | 10 |
| 17 | With the help of a flowchart for sign-magnitude addition/subtraction, explain the steps involved in developing a hardwired control unit. | 10 |
| 18 | Using a block diagram analyse the design of a microprogram control for a processor unit. | |
| 19 | What is a control word? With the help of proper illustrations and assumptions show how a designer would compose a control word for the processor unit. | 10 |
| 20 | With the help of a diagram establish the functioning of microprogram sequencer in a microprogram controlled processor. | 10 |
