

Reg No: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fourth Semester B.Tech Degree Examination July 2021 (2019 Scheme)

Course Code: ECT206

Course Name: COMPUTER ARCHITECTURE AND MICROCONTROLLERS

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

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|----|---|-------|
| 1 | Explain the significance of accumulator, program counter and stack pointer in processor operation. | 3 |
| 2 | List the difference between RISC and CISC processors. | 3 |
| 3 | Describe the function of Program status word (PSW) in 8051 microcontroller. | 3 |
| 4 | List the interrupts of 8051 and its ROM locations. | 3 |
| 5 | Write an 8051 C program to send values 00-FF to port P1. | 3 |
| 6 | Write an 8051 assembly language program to add two 8bit numbers stored in external RAM memory. | 3 |
| 7 | Explain the procedure of doubling the baud rate of data transfer in 8051 serial communication. | 3 |
| 8 | Assume XTAL=11.0592. Compute the value to be loaded into TH0 and TLO (mode 1) to incorporate a time delay of 5ms. | 3 |
| 9 | Explain 'Locality of reference' in Cache memory system. | 3 |
| 10 | Differentiate SRAM and DRAM memory cells. | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

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|----|---|---|
| 11 | a) Illustrate the algorithm for division of two 4 bit signed binary numbers, -6/4. Write the algorithm or draw the flowchart also. | 8 |
| | b) Explain the basic operations of a general processor in executing an instruction. | 6 |
| 12 | a) Write down the range of numbers that can be represented using IEEE 754 single precision floating point representation. How do we represent zero, infinity and 49 in IEEE 754 format. | 8 |
| | b) Draw the internal architecture of a general processor and explain the various components. | 6 |

Module -2

- 13 a) Explain the RAM memory organization of 8051 microcontroller using a schematic diagram. Also list the 8051 Special function registers and its functions. 9
- b) What is stack? Explain the role of stack in program execution during a CALL instruction. 5
- 14 a) Explain about the ports of 8051 and also illustrate the Port 0 circuit read and write operation. 8
- b) Explain the 'Rotate' instructions used in 8051 microcontroller. 6

Module -3

- 15 a) Write an 8051 assembly language program to sort the ten numbers stored in memory locations 30H to 39H in ascending order. Comment all lines of the program. 8
- b) Write an 8051 C code to convert the analog input provided to ADC chip to the digital value and store the result in memory location. 6
- 16 a) Write an 8051 C program to send letters 'M', 'D' to LCD using delays. 7
- b) Using a schematic diagram explain the procedure of interfacing KEYBOARD to 8051 microcontroller. 7

Module -4

- 17 a) Explain the characteristics and operations of mode 1 programming of Timers in 8051 microcontroller. 6
- b) Explain the steps to transfer data serially in 8051. 8
- Write an 8051 assembly language program to transfer 'Y' serially at baud rate 9600 continuously through Port 0.
- 18 a) Explain ARM 7 register architecture. 8
- b) Explain the operation of a) Assembler b) compiler c) Debugger 6

Module -5

- 19 a) Explain programmed I/O and interrupt driven I/O for data transfer in computers. 8
- b) Explain RAM and ROM memory chips. 6
- 20 a) Explain associative mapping of cache memory for a 4K cache with block size 128 and word size 16. Draw necessary figures. Specify the main memory address. 8
- b) Explain the memory hierarchy model using a layout diagram. 6