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

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**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S5 (R, S) / S3 (PT) (R, S) Examination December 2023 (2019 Scheme)



**Course Code: EET 303**

**Course Name: MICROPROCESSORS AND MICROCONTROLLERS**

Max. Marks: 100

Duration: 3 Hours

**PART A**

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

Marks

- 1 Explain the functions of the following 8085 pins: (i) ALE (ii) READY (iii) TRAP (3)
- 2 Define instruction cycle, machine cycle and T-states in 8085. (3)
- 3 Write an 8085 ALP program to find the 2's complement of an 8-bit number stored in memory location 2000H (3)
- 4 List the conditional Jump instructions of 8085. (3)
- 5 What are the challenges in embedded systems design? (3)
- 6 Define the PSW register of 8051. (3)
- 7 Differentiate between ACALL and LCALL instructions of 8051. (3)
- 8 Write an 8051 C program to send values of -4 to +4 to port P1. (3)
- 9 Explain how are interrupts enabled and disabled in 8051 microcontroller. (3)
- 10 Explain the role of SCON register in 8051. (3)

**PART B**

*(Answer one full question from each module, each question carries 14 marks)*

**Module -1**

- 11 a) Explain the functional block diagram of 8085 microprocessor. (10)
- b) With the help of examples, explain the operation of DAA and XTHL instructions in 8085 (4)
- 12 a) Sketch and explain the timing diagram of the instruction MVI A, 05H with opcode 3EH stored in the memory location 4500H. (8)
- b) Differentiate between one-byte, two-byte and three-byte instructions of 8085 with suitable examples. (6)

**Module -2**

- 13 a) Write and explain an ALP in 8085 to find the largest number in a data array. (8)

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- b) Write a delay subroutine program in 8085 using a register pair. Find the maximum delay obtained under this condition. Assume the system clock frequency is 3MHz. (6)
- 14 a) Explain PUSH and POP instructions of 8085 with examples. (8)
- b) Let register B of 8085 hold 93H and accumulator hold 15H. Illustrate the results of the instructions ORA B, XRA B and CMA. (6)

**Module -3**

- 15 a) Using appropriate address decoding technique design a memory interfacing circuit to interface 4 numbers of 8KB RAM Chips with 8085 and explain (10)
- b) Draw the control word format for the BSR and I/O modes of 8255. (4)
- 16 a) With the help of a neat diagram, explain the architecture of 8051 microcontroller. (10)
- b) Explain I/O ports and their functions in 8051. (4)

**Module -4**

- 17 a) Write an ALP in 8051 to add two 16-bit numbers. (7)
- b) Differentiate between the various embedded C data types of 8051 microcontroller with examples. (7)
- 18 a) Write an ALP in 8051 to create a square wave with ON time 3ms and OFF time 10ms on all pins of Port 0. Assume XTAL= 11.05MHz. (8)
- b) Discuss the various bit handling instructions of 8051. (6)

**Module -5**

- 19 a) Explain the role of TMOD and TCON registers in 8051. (8)
- b) Indicate which mode and which timer are selected for each of the following: (i) MOV TMOD, #01H (ii) MOV TMOD, #12H (iii) MOV TMOD, #20H (6)
- 20 a) Design a circuit to interface ADC with the 8051 microcontroller. (6)
- b) Explain how serial port programming is done in 8051 with the help of an example program (8)

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