Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), DECEMBER 2023
ELECTRICAL AND ELECTRONICS ENGINEERING
(2020 SCHEME)

Course Code: **20EET303**

Course Name: **Microprocessors and Microcontrollers**

Max. Marks: **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Find out the contents of the stack pointer (SP) and the HL register pair after executing the following instructions.
   4000 LXI SP, 47FF
   4003 CALL 4006
   4006 POP H
2. Define the terms instruction cycle, machine cycle and T- state.
3. In 8085, the CALL instruction is similar to PUSH instruction. Substantiate this statement by pointing out the similarities and differences between them.
4. Compare RAL and RLC instructions in 8085 microprocessor.
5. Determine the control word that is to be loaded into the control register of 8255 programmable peripheral interface so that all the ports are configured as output ports in mode 0.
6. Differentiate between microprocessors and microcontrollers.
7. By using one instruction, how can decrement and jump operation be performed in 8051 microcontroller?
8. Mention the advantage in using the EQU directive to define a constant value?
9. Examine the effect if the serial port mode specifier bits (SCON.7 and SCON.6) of 8051 microcontroller are varied?
10. Define the term baud rate.

PART B

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

MODULE I

11. a) With a neat block diagram, explain the architecture of 8085 microprocessor. (12)
    b) Describe the significance of READY signal in 8085 microprocessor? (2)

OR

12. a) With the help of a timing diagram, explain the execution of the instruction MVI A, 55H. (12)

b) How is CMP instruction executed in 8085 microprocessor? List out the flags that are modified by this operation? (2)

MODULE II

13. a) An array of 5 numbers is given below. 8000 is the memory location where the size of the array is given. The contents of array are stored from 8001 to 8005.
8000 : 05H
8001 : FFH
8002 : 06H
8003 : 8CH
8004 : 93H
8005 : A1H
Write a program in assembly language to sort the given array in ascending order using 8085 microprocessor. (7)

b) Write a program in assembly language to generate a time delay of 10ms using 8085 micorprocessor. Assume that the clock frequency is 3MHz. (7)

OR

14. a) Write a program in assembly language to convert a given BCD number into its equivalent binary number using 8085. (10)

b) During an arithmetic operation, 8085 microprocessor adds 78H and 88H. Specify the contents of the accumulator and the status of the S, Z, and CY flag? (4)

MODULE III

15. a) Explain the various modes of operation in the 8255 programmable peripheral interface. (12)

b) Differentiate between hardware and software interrupts in 8085 microprocessor. (2)

OR

16. a) Explain about the program status word (PSW) in 8051 microcontroller. How is RAM allocated in the 8051 microcontroller? (10)

b) Differentiate between hard and soft real time systems. (4)

MODULE IV

17. a) Mention the different types of addressing modes in 8051 microcontroller? Explain the various ways of accessing data using suitable examples. (10)

b) An 8051 microcontroller based system has a crystal frequency of 11.0592 MHz. Calculate the time taken by the system to execute the instruction MUL AB. (4)

OR

18. a) Write a program in assembly language to generate a square wave of 33% duty cycle on bit 2 of port 1 in 8051 microcontroller. (8)

b) Write an embedded C program to read data from port A and write it to both ports B and C in 8051 microcontroller. Assume a base address of 4000H for the 8255 programmable peripheral interface. (6)

MODULE V

19. a) Demonstrate how an ADC can be interfaced with 8051 microcontroller. (8)

b) Explain the timer auto reload mode in 8051 microcontroller. (6)

OR

20. a) Explain in detail how various timer operation modes are set in 8051 microcontroller using timer mode (TMOD) register. (7)

b) Using neat block diagram, explain how different peripherals can be connected to Arduino. (7)

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