

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), JULY 2022

ELECTRONICS AND COMMUNICATION ENGINEERING
(2020 SCHEME)

Course Code: 20ECT206

Course Name: Computer Architecture and Microcontrollers

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Differentiate Harvard and Von-Newman architecture.
2. Which are the processor operations in an Instruction cycle.
3. Out of Direct addressing and Indirect addressing method which one is best suitable for looping, justify your answer.
4. Illustrate the operations performed in the execution of the following instructions.
(i) RLC A (ii) JBC C, loop (iii) CJNE A, 50H, loop.
5. Write an embedded C program to generate Triangular Wave using DAC.
6. Write an assembly language program to blink LED with one second delay.
7. Differentiate Timer and Counter?
8. Explain the procedure for doubling the baud rate of data transfer in 8051 serial communication.
9. Explain 'Locality of reference' in Cache memory system.
10. Differentiate SRAM and DRAM memory cells.

PART B

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

MODULE I

11. a) With an example explain any one algorithm for the multiplication of two binary numbers. (9)
- b) Give the instruction wise explanation and status of stack memory for the following instructions if R6=25H and R1=12H. (5)
Push 6
Push 1
Pop 3
Pop 2

OR

12. a) With the proper timing diagram of any instruction explain the concept of instruction cycle. (9)
- b) Compare RISC and CISC architecture. (5)

MODULE II

13. a) Explain the functions of the four different ports of 8051 microcontroller. (9)
b) List any five special function registers of 8051 and explain its functions. (5)

OR

14. a) Illustrate the complete memory organization of 8051 microcontroller. (9)
b) Describe any five classification of the instruction set of 8051 with example. (5)

MODULE III

15. a) Write an assembly language program for 8051 microcontroller to sort N numbers in ascending order and print the second largest number in memory location 0x 4400H. Assume that the numbers are stored in continuous locations starting from 0x 4300 onwards. (7)
b) Write an embedded C program for 8051 microcontroller to repeatedly display the sequence 1,3,5,7,9 using a 7 – segment display with a delay of 1 second between each number. (7)

OR

16. a) Write an embedded C program for 8051 microcontroller to display the word HELLO in the first row and WORLD in the second row using LCD display. (9)
b) Write an embedded C program for 8051 microcontroller to rotate a stepper motor in clockwise and anti-clockwise direction with a delay of 2 seconds in between. (5)

MODULE IV

17. a) Explain the characteristics and operations of mode 2 programming of Timers in 8051 microcontroller. (7)
b) Explain the register architecture of ARM 7 processor. (7)

OR

18. a) Explain the steps for serial data transfer in 8051. Write an 8051-assembly language program to transfer 'M' serially at a baud rate of 4800 continuously through Port 0. (9)
b) Differentiate Assembler, Compiler and Debugger. (5)

MODULE V

19. a) Differentiate interrupt driven and programmed I/O. Which is more efficient with respect to processor utilization? Justify your answer. (8)
b) Explain the characteristics of RAM and ROM. (6)

OR

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)
