

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (S), AUGUST 2023**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 CISC and RISC architectures.
2. Explain the following (a) Program counter (b) Accumulator (c) Stack pointer.
3. Explain the structure of a Program status word(PSW).
4. Summarize the difference between a microprocessor, microcontroller and embedded system.
5. Assume that bit P2.3 is an input and represents the condition of an oven. If it goes high, it means the oven is hot. Monitor the bit continuously. Whenever it goes high, send a high to low pulse to port P1.5 to turn on a buzzer.
6. Write an 8051 C program to toggle bits of P1 continuously forever with some delay.
7. Describe each bit of timer control (TCON) register.
8. Differentiate assembler, interpreter and compiler.
9. Illustrate the memory hierarchy of a computer system.
10. Describe serial control (SCON) register.

PART B***(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) With an example illustrate 'shift and add' method for multiplying two binary numbers. (9)
- b) Illustrate how an instruction being executed with in a processor. (5)

OR

12. a) Illustrate instruction cycle with proper timing diagram. (7)
- b) Explain how an interrupt is handled with in a processor. (7)

MODULE II

13. a) Explain the architecture of 8051 with block diagram. (10)
- b) List out the features of 8051. (4)

OR

14. a) Explain addressing modes of 8051 with examples. (7)
b) Describe the classification of the instruction set of 8051 with examples. (7)

MODULE III

15. a) Write an embedded C program for converting analog signal to digital signal using ADC and reproduce the input signal using DAC. (8)
b) Write an assembly language program to sort N numbers in descending order. Assume that the numbers are stored in continuous locations from 4200h onwards. (6)

OR

16. a) Write an embedded C program for 8051 microcontrollers to continuously display a sequence 0,2,4,6,8 using 7-segment display with adelay of 1.5 seconds between each number. (8)
b) Write an assembly language program to find largest from an array of 10 numbers. Assume that the numbers are stored in continuous locations from 4500h onwards. (6)

MODULE IV

17. a) Generate a square wave with an ON time of 3ms and an OFF time of 10ms on pin 1.6. Assume an XTAL of 22MHz. Use Timer0 Mode 1 for 8051 programming. (8)
b) Describe ARM 7 register architecture. (6)

OR

18. a) Assume a switch (SW) is connected to P0.7. Write a program to monitor its status and send two messages to serial port continuously as follows. If SW=0, send 'YES'. If SW=1, send 'NO'. (9)
b) Explain how a HLL program is executed as machine language in a processor. (5)

MODULE V

19. a) Differentiate interrupt driven I/O and programmed I/O. Which one is more efficient with respect to processor utilization. Justify your answer. (8)
b) Explain about memory management using virtual memory. (6)

OR

20. a) Differentiate synchronous and asynchronous I/O. Which one is more efficient with respect to processor utilization. Justify your answer. (8)
- b) Explain direct mapping of cache memory with example. (6)
