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
ROBOTICS AND AUTOMATION
(2020 SCHEME)

Course Code : 20RBT206

Course Name: Microcontrollers and Embedded Systems

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

PART A

(Answer all questions. Each question carries 3 marks)

1. List any six features of 8051 microcontroller.
2. What is the function of DPTR in 8051?
3. Find the value of TMOD register to operate timer 1 of 8051 in mode 1.
4. Define baud rate.
5. Summarize the role of interpreter in embedded system.
6. Define embedded system. List four main features of embedded system.
7. Write a program to read the status of a switch connected to Arduino and print it to the serial monitor.
8. Write a short description about the GPIO pins of Arduino Uno.
9. What are the services offered by Operating System?
10. Briefly explain five states of process in an Operating System.

PART B

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

MODULE I

11. Explain the following registers used in 8051. i)Program Counter ii)PSW iii)Instruction register iv)A and B registers. (14)

OR

12. a) Explain five addressing modes of 8051 with examples. (10)
    b) Write an Assembly Language Program in 8051 to add two 16 bit numbers. (4)

MODULE II

13. a) Explain TMOD register in 8051? Explain different modes of operation of timers in 8051. (9)
    b) With the help of an interfacing diagram, explain how DAC can be interfaced to 8051. Develop an Assembly Language Program to generate square wave with 50 percent duty cycle using DAC. (5)

OR

14. a) Draw the schematic to connect a LED to 8051 pin P1.3 and develop a program to blink the LED continuously. (8)
    b) List the interrupts available in 8051. Explain. (6)

MODULE III

15. a) With the help of a block diagram, explain the structure of SoC. (6)
    b) Explain the architecture of an Embedded system. (8)

OR

16. a) Explain the functions of different tool chain elements in an embedded system. (8)
    b) Explain the different steps involved in the design process of an embedded system. (6)

MODULE IV

17. a) Write an Arduino program to monitor the status of LM35 temperature sensor and display the output using seven segment displays. Also draw the interfacing diagram. (10)
    b) Draw the board level block schematic of Arduino Uno and mark all pins. (4)

OR

18. a) Explain in detail about the memory organization in Arduino Uno. (10)
    b) Write a program to control the speed of a DC motor using Arduino Uno. (4)

MODULE V

19. a) Describe the seven layer structure of an Operating System. (4)
    b) Explain any four kernel functions in an Operating System. (10)

OR

20. Explain the following communication protocols i) SPI ii) USB . (14)

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