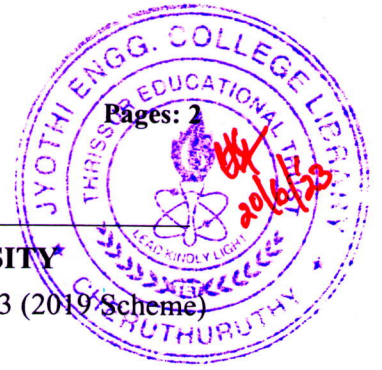


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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree Supplementary Examination June 2023 (2019 Scheme)

Course Code: RAT206

Course Name: MICROCONTROLLERS AND EMBEDDED SYSTEMS

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

		Marks
1	What are the components of an 8051 microcontroller?	3
2	Differentiate between Microcontroller and Microprocessor.	3
3	In many microprocessor there are two different instructions for subtraction, what instruction 8051 uses and which circuitry it used to perform subtraction?	3
4	8051 uses certain timers/counters? What are that timers and which register is used to set the various timer operation mode?	3
5	What are the important characteristics of an Embedded System?	3
6	Developing an embedded system mainly goes through various phases of development life cycle. List down the various stages of Embedded Product Development life cycle.	3
7	Why we should use Arduino? In which language Arduino software was written?	3
8	What is an IDE? What are the features of Arduino IDE?	3
9	When RTOS necessary and when it is not necessary in the Embedded system?	3
10	Define task and task state.	3

PART B

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

Module -1

- | | | |
|----|--|---|
| 11 | a) Write down the step by step process of writing Assembly Language program (ALP) with the help of suitable example. | 7 |
| | b) Draw and compare Von-Neumann and Harvard architecture. | 7 |
| 12 | a) How ports and pins are associated in 8051 Microcontroller? Draw suitable diagram to illustrate your answer. | 7 |
| | b) CPU can access data in various ways which are called addressing modes. Explain various addressing modes used by 8051 microcontroller? | 7 |

Module -2

- 13 a) LED are connected to bits P1 and P2. Write an 8051 C programming code that show the count from 0 to FFH(0000 0000 to 1111 1111 in binary) on the LEDs 6
 b) What are the steps followed by the Microcontroller upon activation of an interrupt? How interrupt can be enabled or disabled? 8
- 14 a) Assume that bit P2.3 is an input and represents the condition of an oven. If it goes high, it means that 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
 b) With the help of suitable example explain how LCD interfacing done in 8051 microcontroller. 8

Module -3

- 15 a) What hardware and software resources required for designing an embedded system for an alarm clock? List your assumptions and satisfy your answer with the help of suitable block diagram. 7
 b) Draw the waterfall model of the embedded product development process and explain it. 7
- 16 a) List the software development tools in an embedded system and state the function of Compiler and Debugger. 7
 b) Describe the parallel port and serial port device drivers in embedded systems. 7

Module -4

- 17 a) Define sensors and actuators. Explain how they interact with the physical world. 6
 b) Explain different pins/parts of Arduino Board. 8
- 18 a) Give technical specifications of Arduino Uno. 6
 b) Write a program to play buzzer sound using Arduino Uno. 8

Module -5

- 19 a) Write a short note on Context Switch and Task Synchronization. 7
 b) Explain the characteristic of Real Time embedded operating system. 7
- 20 a) State the function of Scheduler. Also illustrate the basic mechanism of pre-emptive scheduling. 7
 b) What are the services provided by the Real Time Operating System (RTOS)? Explain the difference between RTOS and general operating system. 7
