



Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech (Minor) Degree Examination July 2021 (2019 admission)

Course Code: ECT282**Course Name: MICROCONTROLLERS****Max. Marks: 100****Duration: 3 Hours****PART A***(Answer all questions; each question carries 3 marks)*

| | | Marks |
|----|---|-------|
| 1 | What is the relevance of Program Counter Register? | 3 |
| 2 | What are the major computer architectures? Enumerate their differences. | 3 |
| 3 | Explain the importance of following pins of 8051 microcontroller: i) $\overline{\text{PSEN}}$ ii) $\overline{\text{EA}}$ | 3 |
| 4 | State the Timer modes in 8051 microcontroller. | 3 |
| 5 | Write a program to multiply two numbers stored in R1 and R2 registers of 8051 microcontroller. | 3 |
| 6 | An ADC with 'n'-bits is used for interfacing with 8051 microcontroller. What is the significance of the number of bits for ADC? | 3 |
| 7 | Explain the working of Tilt sensor? | 3 |
| 8 | List any three important features of ATMEGA 2560 microcontroller. | 3 |
| 9 | What are the important features of Raspberry Pi 4 board? | 3 |
| 10 | Describe CPSR register of ARM-7. | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

| | | |
|----|--|----|
| 11 | a) Draw and explain the general architecture of processor. | 10 |
| | b) What is the need of system bus? | 4 |
| 12 | a) Explain in detail about the various instruction processing operations in a computing processor. | 8 |
| | b) Explain the following terms regarding a processor: | 6 |
| | i) Status Register | |
| | ii) Accumulator | |
| | iii) Stack Pointer | |

Module -2

- 13 a) Draw and explain the architecture of 8051 microcontroller. 10
b) Describe about the external interrupts in 8051. 4
- 14 a) How is the internal memory organized in 8051 microcontroller? 6
b) Explain about the various addressing modes in 8051. 8

Module -3

- 15 a) Explain the interfacing of a stepper motor to 8051 microcontroller having step angle 2° to rotate 128° with necessary diagram. 7
b) Write a program for 8051 microcontroller to find the sum of 10 numbers stored in the memory location starting from 30H and store the sum in Accumulator and carry in R7 register. 7
- 16 a) Explain the interfacing of an LCD display to 8051 microcontroller with necessary diagram. 7
b) Write a program for 8051 microcontroller to perform $Z = X/Y$, where Y and X are stored in the memory location 40H and 41H respectively. The quotient and remainder of result, Z should be stored at 42H and 43H respectively. 7

Module -4

- 17 a) Explain the pin configuration of Arduino MEGA 256 board. 8
b) How is ambient temperature sensed using Arduino board? Illustrate the idea. 6
- 18 a) Arduino open-source boards can be used for home security. Explain with a schematic. 8
b) Explain the working of a 7-segment LED display with a schematic. 6

Module -5

- 19 a) Explain ARM-7 register architecture with a neat diagram. 8
b) How we can set up a portable Bluetooth speaker with Raspberry pi-4 board? 6
- 20 a) State any five practical applications of Raspberry pi-4 board. 5
b) What is the importance of Programmer's model? Explain ARM Programmer's model in detail. 9

