

TED (15)-6132
(Revision- 2015)

A20-00973

Reg.No.....
Signature.

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – APRIL -2020.

MICROCONTROLLERS

(Maximum Marks : 75)

[Time : 2.15 hours]

PART–A

Marks

I. Answer **any three** questions in one or two sentences. Each question carries 2 marks.

1. Write instruction to move the value 0x34 into the R29 register in AVR.
2. Find the period of instruction cycle for an AVR with a crystal frequency of 16MHz.
3. Which ports of AT mega 32 are bit-addressable.
4. Which register holds TOV0 (Timer Overflow flag) and TOV1 bits.
5. Define baud rate. (3x2=6)

PART - B

II Answer **any four** of the following questions . Each question carries 6 marks.

1. Write an overview of AVR family of microcontrollers.
2. Write about AVR Status Register and specify the function of each bit in the status register.
3. Explain the role of DDRx and PORTx registers in I/O operations.
4. Write an AVR C program to convert ASCII digits of “4” and “7” to packed BCD and display them on PORT B.
5. Describe about Normal Mode and Compare on match mode(CTC) operations of timers in AVR.
6. Compare and Contrast interrupt and polling.
7. Describe about sending data and commands to LCD. (4x6=24)

PART - C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT I

- III** (a) Describe about AVR Data Memory Organization with appropriate diagram. (9)
- (b) Explain any four features of RISC as implemented in AVR microcontroller. (6)

OR

- IV** (a) Describe stack and stack pointer in AVR. Mention the role of stack in CALL and RET instruction. (9)
- (b) Write a program to toggle all the bits of I/O register PORTB every 1 second. Assume that the crystal frequency is 8 MHz and the system is using an AT mega 32. (6)

UNIT- II

- V** (a) List four bit manipulation commands in AVR. Explain each with an example. (9)
- (b) Assume that PB3 is an input and represents the condition of a door alarm. If it goes LOW, it means that door is open. Monitor the bit continuously. Whenever the bit goes LOW, send a HIGH-to-LOW pulse to port PC5 to turn on a buzzer. Write an AVR C program to implement the above. (6)

OR

- VI** (a) Describe the three different ways to implement time delays in AVR Embedded C. Mention the two factors that can affect the accuracy of time delay. (9)
- (b) Write an AVR C program to toggle all the bits of PORT B continuously with a time delay of 100ms. Assume that the system using AT mega 32 with a XTAL=8 MHz. (6)

UNIT- III

- VII** (a) List the basic registers of AVR timers. Specify the functions of each registers. (6)
- (b) Write an AVR C program to toggle only PORTB.4 bit continuously every 70 microsecond. Use Timer0, Normal Mode, 1:8 prescalar to create the delay. Assume XTAL=8MHz. (9)

OR

- VIII** (a) List and Explain about External Hardware Interrupts in ATMega 32. (6)
- (b) Write an AVR C program to generate square wave on PORTB.5 pin using Timer0 interrupt, while at the same time transferring data from PORTC to PORTD. (9)

UNIT – IV

- IX** (a) Explain about the connection between AT mega 32 to RS232 with diagram. (9)
- (b) Write a C program for the AVR to transfer “G” serially at 9600 baud, continuously. Use 8-bit data and 1 stop bit. Assume XTAL=8 MHz. (6)

OR

- X** (a) Explain ADC and its major characteristics. (9)
- (b) List the features of ATMega 32 ADC. (6)