TED (15) – 6132

(REVISION — 2015)

# DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

## MICROCONTROLLERS

[*Time* : 3 hours

(Maximum marks : 100)

## PART — A

(Maximum marks : 10)

Marks

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

1. List four features of AVR.

2. Write the number of general purpose registers in AVR.

3. Name different ports in ATMega32.

4. Give the value of TCCR0 for Timer0 in Normal mode with no prescale.

5. Name the serial interface standard used in serial communication.          (5 × 2 = 10)

## PART — B

(Maximum marks : 30)

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

1. Give different data format representation in AVR with example.

2. Illustrate the need of the initialization of stack pointer in AVR.

3. Describe the steps to make PORTA as output and PORTB as input in AVR with example in assembly language and in C.

4. Describe different ways to create delay in AVR embedded C.

5. Compare CTC and normal mode in Timer0 and show how these modes are selected in timer0.

6. Define Interrupt.  Describe different steps in executing an interrupt.

7. Differentiate synchronous and asynchronous methods of serial data communication.          (5 × 6 = 30)

## PART — C

### (Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

### UNIT — I

III  (a)  Explain the Data memory organization of AVR.          10

    (b)  State the role of program counter in Executing a program.          5

### OR

IV  (a)  Show the bit SREG in AVR and indicate the function of each bit.          10

    (b)  Describe LDI, LDS and IN instructions with example.          5

### UNIT — II

V  (a)  Illustrate conversion of data from BCD to ASCII with an example.          5

    (b)  Write AVR C program to convert Packed BCD $0 \times 45$ to ASCII and display the bytes in PORTB and PORTC.          10

### OR

VI  (a)  Write short note on Data Serialization in C.          5

    (b)  Write a program to send the value $0 \times 45$ serially one bit at a time through Pin number 4 of PORTD. LSB should go first.          10

### UNIT — III

VII  Explain Timer0 in detail with all its registers.          15

### OR

VIII  (a)  Explain External Hardware interrupts in Atmega32.          8

    (b)  Describe enabling and disabling of Timer0 overflow interrupt with instructions.          7

### UNIT — IV

IX  Give the pin details of LCD and explain LCD interfacing with diagram.          15

### OR

X  (a)  Describe the use of DAC and its interfacing with an AVR with Diagram.          9

    (b)  Explain the interfacing of a temperature sensor to AVR with diagram.          6

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