



TED (15) – 5041

(REVISION — 2015)

Reg. No.....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

**EMBEDDED SYSTEM**

[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. How many general purpose registers are there in ATmega32 ?
2. Give any two assembler directives in AVR assembly language program.
3. Name two I/O registers associated with timers and give its size in bits.
4. Define an embedded system.
5. State the role of kernel in Embedded OS.

(5×2 = 10)

**PART — B**

(Maximum marks : 30)

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

1. Describe the various members of AVR family.
2. Describe instruction pipeline.
3. Write an Assembly language program to add two bytes of data from the memory address of 0×300 and 0×301, store the result in 0×302.
4. Describe the logic operators in embedded C.
5. Describe the Arduino development board.
6. Write any six application area of embedded systems.
7. Describe the data memory of ATmega32.

(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) Draw and explain the simplified architecture of ATmega32. 9  
 (b) Describe the general purpose registers of ATmega32. 6

OR

- IV (a) Briefly describe the Addressing modes ATmega32 microcontroller. 8  
 (b) Describe the status register of ATmega32. 7

## UNIT — II

- V (a) Describe data transfer and arithmetic instructions with example. 8  
 (b) Write an Assembly Language Program to toggle the bits of PORTB Continuously by writing 0x55 & 0xAA with some delay. 7

OR

- VI (a) Describe rotate and shift instructions with example. 8  
 (b) Write an Assembly Language Program to convert the BCD number 0x65 to ASCII code and place the result in R21 and R22. 7

## UNIT — III

- VII (a) Describe the data types and time delays in embedded C. 8  
 (b) Write an AVR C program to send values 0x00 to 0xFF to PORT B with 500ms delay. 7

OR

- VIII (a) Draw the structure of TIMER0 and write the steps to program the TIMER0 in normal mode ? 9  
 (b) Explain the ATmega32 connection to RS232 with diagram. 6

## UNIT — IV

- IX (a) Explain Specialties of embedded system. 8  
 (b) List the features of embedded system. 7

OR

- X (a) Describe the architecture of embedded operating system. 9  
 (b) Define (i) Task (ii) Task scheduling (iii) Context switching. 6