

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE – APRIL -2021.

**EMBEDDED SYSTEMS**

(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. List any four assembler directives in AVR.
2. What is the size of (i) standard I/O memory (ii) On-Chip ROM in Atmega 32?
3. List any two AVR logic instructions with format.
4. Write the content of PORTB on executing the following.  
(i)  $PORTB = 0x35 \& 0x0F$     (ii)  $PORTB = 0x54 \wedge 0x78$
5. List any two RTOs. (3x2=6)

**PART - B**

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

1. Explain the role of stack when a CALL instruction is executed.
2. Compare various members of AVR family.
3. Illustrate the role of each I/O register in outputting and the inputting data.
4. Explain the sequence of events that happen in AVR micro-controller on receiving an interrupt request.
5. Explain how ATmega 32 can be interfaced with RS232 connectors.
6. Explain the concept of task scheduling and context switching in Embedded Systems.
7. State the need of EEPROM in AVR. What are the advantages of EEPROM over SRAM? [4x6 =24]

**PART - C**

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

**UNIT I**

- III** (a) Explain the different addressing modes of AVR micro-controllers with examples. (8)

- (b) Explain the status register of AT mega 32 microcontroller. (7)

**OR**

- IV** (a) Briefly explain the data memory organization in ATmega 32. (8)

- (b) Briefly explain the architecture of ATmega 32 with suitable diagrams. (7)

**UNIT- II**

- V** (a) Explain instruction pipelining in AVR. (8)

- (b) Write a program to load PORTA with the value \$AA and toggle it 200 times. (7)

**OR**

- VI** (a) Explain Rotate and Shift instructions in AVR using suitable examples. (8)

- (b) Write an AVR assembly program to add two 16 – bit numbers 1234 H and 5678 H stored in the locations starting from 0x0140. The results are to be saved to locations starting from 0x150. (7)

**UNIT- III**

- VII** (a) Write an AVRC program to convert ASCII ‘4’ and ‘7’ to packed BCD. (8)

- (b) Explain how Timer 0 can be configured for generating a given time delay in the normal mode. (7)

**OR**

- VIII** (a) Explain the different data types in AVRC. (8)

- (b) Write an AVRC program to toggle the 4<sup>th</sup> pin of PORT B continuously without disturbing other pins of the PORT B. (7)

**UNIT – IV**

- IX** (a) Explain the kernal architecture in embedded systems and its importance. (8)

- (b) Explain some of the advantages of Arduino-based development platform for embedded systems. (7)

**OR**

- X** (a) List the features of an embedded System. (8)

- (b) Describe the architecture of an Embedded Operating System. (7)

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