

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER - 2024**

EMBEDDED SYSTEMS

[Maximum Marks : 75]

[Time : 3 hours]

PART-A

I. Answer **all** the following questions in one word or sentence. Each question carries 1 mark.

(9x1=9 marks)
Module Outcome Cognitive level

| | | | |
|---|---|-------|---|
| 1 | List any two applications of embedded systems. | M1.02 | R |
| 2 | Define Sensors in an embedded system. | M1.05 | R |
| 3 | Draw the pin out of the USB connector used for external communication interface. | M1.06 | U |
| 4 | Draw TIFR register of Atmega 32. | M2.04 | U |
| 5 | Name the 8-bit timer available in Atmega 32. | M2.04 | R |
| 6 | Draw the circuit diagram of the push button switch connected to AVR in Pull-Up mode. | M3.02 | U |
| 7 | Name the Pins used for SPI communication in AVR. | M3.08 | R |
| 8 | Define Kernal space in OS. | M4.01 | R |
| 9 | Name the operating system that allows a user to perform more than one task at a time. | M4.02 | R |

PART B

II. Answer **any Eight** questions from the following. Each question carries 3 marks.

(8x3=24 marks)
Module Outcome Cognitive level

| | | | |
|---|---|-------|---|
| 1 | Classify embedded systems based on any two criteria. | M1.02 | U |
| 2 | Draw the architecture of the embedded system. | M1.04 | U |
| 3 | List different types of on-board communication interfaces in an embedded system. | M1.06 | R |
| 4 | Develop an AVR C program to monitor bit 3 of Port C, if it is HIGH, send FOH to Port C, otherwise, send OFH to Port B. | M2.05 | A |
| 5 | Develop an AVR C program to toggle all the bits of Port B with a time delay of 3 sec. | M2.06 | A |
| 6 | Explain I2C interfacing with AVR. | M3.07 | U |
| 7 | Develop an embedded C program to read the status of the push button switch connected to Port D and obtain the output by turning the ON/OFF Relay connected to Port C. | M3.02 | A |

| | | | |
|----|---|-------|---|
| 8 | Draw the circuit diagram of the stepper motor interfacing with AVR. | M3.05 | U |
| 9 | Define the kernel of an embedded operating system. | M4.01 | R |
| 10 | Explain task scheduling in embedded systems. | M4.02 | U |

PART C

Answer **all** questions from the following. Each question carries 7 marks.

(6x7=42marks)

| | | Module Outcome | Cognitive level |
|------|---|-------------------|--------------------|
| III | Compare general-purpose computers and embedded systems. | M1.01 | U |
| | OR | | |
| IV | Explain different types of external communication interfaces in an embedded system. | M1.06 | U |
| V | Explain the features of different AVR family microcontrollers. | M2.01 | U |
| | OR | | |
| VI | Explain the simplified Block diagram of ATmega32. | M2.02 | U |
| VII | Draw and explain the registers associated with I/O ports of Atmega 32. | M2.03 | U |
| | OR | | |
| VIII | Explain different data types in AVR C-programming. | M2.05 | U |
| IX | Develop an embedded C program for interfacing 16*2 LCD with AVR. | M3.04 | A |
| | OR | | |
| X | Develop an embedded C program for interfacing the servo motor with AVR. | M3.05 | A |
| XI | Explain ADC interfacing with AVR. | M3.06 | U |
| | OR | | |
| XII | Explain SPI interfacing with AVR. | M3.08 | U |
| XIII | List Selection criteria for RTOS. | M4.03 | R |
| | OR | | |
| XIV | List any ten popular Real-Time Operating Systems. | M4.05 | R |
