

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, APRIL - 2025**

**EMBEDDED SYSTEM AND REAL TIME OPERATING SYSTEM**

[Maximum marks: 75]

[Time: 3 Hours]

**PART A**

**I. Answer all the following questions in one word or one sentence. Each question carries 1 mark.  
(9 x 1 = 9 Marks)**

		Module outcome	Cognitive level
1	List any two application areas of Embedded system.	M1.01	U
2	AVR microcontroller follows ..... architecture.	M1.02	R
3	The largest hex value that can be stored to an 8-bit register is .....	M2.02	R
4	Write the AVR C statement to set Port D as input port.	M2.03	R
5	Timer 1 of AVR is a ..... bit timer.	M2.05	R
6	The RS pin is a ..... pin for the LCD.	M3.01	R
7	In reading the column of a keyboard matrix, if no key is pressed, we should get all values as .....	M3.01	R
8	Name the part of operating system which act as an abstraction layer between system resource and user application.	M4.01	R
9	..... is also known as a lightweight process.	M4.03	R

**PART B**

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

**(8 x 3 = 24 Marks)**

		Module outcome	Cognitive level
1	Write any three purposes of Embedded system.	M1.01	U
2	State the role of DDRx, PORTx and PINx register in I/O operations.	M1.03	R
3	Write an AVR C program to get a byte of data from PORTB and send it to PORTC continuously.	M2.02	A
4	Explain any three bit-wise logical operators in AVR C with examples.	M2.03	U
5	Write any three sources of Interrupts in AVR microcontroller.	M2.07	U
6	Explain how to send data to LCD.	M3.01	U
7	Draw the block diagram of interfacing RS232 with ATmega32.	M3.01	U
8	Differentiate between Hard Real-time system and Soft Real-time system.	M4.02	U

9	Differentiate between Multiprocessing and Multitasking.	M4.04	U
10	Write any three Non-functional requirements in selecting a Real time operating system.	M4.08	R

### PART C

**Answer all questions. Each question carries seven marks.**

**(6 x 7 = 42 Marks)**

		Module outcome	Cognitive level
III	Describe the functions of each bit in the status register SREG.	M1.03	U
	<b>OR</b>		
IV	Draw and explain the data memory organization of ATmega32.	M1.03	U
V	Write an AVR C program to get a byte of data from Port C. If it is less than 100, send it to PORT B; otherwise to PORT D.	M2.02	A
	<b>OR</b>		
VI	Write an AVR C program to toggle all the bits of PORT B continuously by (i) Using the Inverting operator. (ii) Using the EX-OR operator.	M2.03	A
VII	Write an AVR C program to convert packed BCD 0X42 to ASCII and display the bytes on PORT C and PORT D.	M2.04	A
	<b>OR</b>		
VIII	Explain any two basic registers associated with AVR Timer.	M2.05	U
IX	Illustrate how a 4x4 matrix keyboard is interfaced with AVR.	M3.01	U
	<b>OR</b>		
X	Explain ADC and write any two characteristics.	M3.02	U
XI	Explain any three functions of an Operating system.	M4.01	U
	<b>OR</b>		
XII	Explain process state transition diagram.	M4.03	U
XIII	Explain Round Robin scheduling algorithm.	M4.05	U
	<b>OR</b>		
XIV	Describe the role of device drivers in Realtime operating system.	M4.07	U

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