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(Revision-2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 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	The number of general purpose registers in ATmega32 is …….	M1.03	R
2	Write the classification of embedded systems based on complexity and performance.	M1.01	R
3	List any two data types used in AVR C.	M2.01	R
4	Name the 16 bit timer in ATmega32.	M2.05	R
5	Write the AVR C statement to set PORT B as input.	M2.02	U
6	Name the voltage converter that converts RS232 voltage levels to TTL voltage.	M3.01	R
7	Name the serial interface standard used in serial communication.	M3.01	R
8	Define Process.	M4.03	R
9	Name any two task scheduling algorithms.	M4.05	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	Summarize the applications of embedded systems.	M1.01	U
2	Explain the registers associated with each I/O port in ATmega32.	M1.03	U
3	Explain the structure of Program ROM Space.	M1.03	U
4	Develop an AVR C program to get a byte of data from PORT B and send it to PORT C.	M2.01	A
5	Describe the various ways to create a time delay in AVR C.	M2.02	U
6	Predict the value present in PORTB, PORTC and PORTD after executing the following code snippet: PORTB = 0x35 & 0x0F; PORTC = 0x04 | 0x68; PORTD = 0x54 ^ 0x78;	M2.03	A

7	Summarize the features of ADC.	M3.02	U
8	Comment the purpose of RS, E and R/W pins of LCD.	M3.01	U
9	Draw the connection diagram of the temperature sensor LM34/35 to ATmega32.	M4.02	U
10	Classify and explain real time operating system in embedded OS.	M4.02	U

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Compare general purpose computer with micro controllers.	M1.01	U
	OR		
IV	Explain the data memory in ATmega32 with a neat diagram.	M1.03	U
V	Write an AVR C program to send hex values for ASCII characters of 0,1,2,3,4,5,A,B and C to PORTB.	M2.01	A
	OR		
VI	Explain the steps to execute an interrupt in AVR microcontroller.	M2.07	U
VII	Write an AVR C program to convert packed BCD 0x29 to ASCII and display the bytes on PORT B and PORTC.	M2.04	A
	OR		
VIII	Describe the modes of operation of Timer 0 in ATmega32.	M2.05	U
IX	Describe how to interface a 4x4 keyboard to ATmega32 with a suitable diagram.	M3.01	U
	OR		
X	Explain how to interface RS232 standard to ATmega32 with connection diagram.	M3.01	U
XI	Describe the structure of a process with suitable diagram.	M4.03	U
	OR		
XII	Explain the features of the task scheduling algorithms FCFS and priority scheduling with suitable examples.	M4.05	U
XIII	Define deadlock and explain the necessary conditions to hold a deadlock.	M4.06	U
	OR		
XIV	Outline the functional requirements to choose an RTOS.	M4.08	U

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