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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: VI**
Branch: Electronics & Telecommunication Engineering **Duration: 3 hrs.**
Course Code: 22ET6PE2ES **Max Marks: 100**
Course: Embedded System Design

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Compare and analyze the features and functionalities of an ES with those of a general purpose system with a relevant block diagram	CO2	PO1	**07**
	b)	As a manager of a company, design the essential rules and guidelines to be followed during the schematic design of an Embedded System	CO3	PO2	**07**
	c)	Analyze an Industry Standard Embedded System Development Lifecycle Model	CO2	PO1	**06**
		OR			
2	a)	Analyze the Functionality of Each Layer in a Basic Reference Embedded System Model	CO2	PO1	**07**
	b)	Design a basic embedded system application for motor control, highlighting key components and functionalities	CO3	PO2	**07**
	c)	Analyze any three types of diagrams utilized in Embedded System Design	CO3	PO2	**06**
		UNIT - II			
3	a)	Design a µController system using 8051, 8k bytes of program ROM & 8k bytes of data RAM. Interface the memory such that starting address for ROM is 0000H & RAM is E000H	CO3	PO2	**10**
	b)	A cache size of 8MB is used and the cost per byte is fixed at $0.001. Find the total cost of cache memory	CO2	PO1	**05**
	c)	For a cache, the hit time is 6 cycles, the miss rate is 4%, and the miss penalty is 100 cycles. Calculate AMAT	CO2	PO1	**05**
		UNIT - III			
4	a)	SPI and I2C are two of the popular protocols used in Serial Communication. Compare and analyze the features of SPI with those of the I2C protocol and discuss conditions under which one is preferred over the other	CO2	PO1	**10**

		b)	Analyze the key features of the CAN protocol. Discuss its applications in automobile industry	*CO2*	*PO1*	**10**
			OR			
	5	a)	Write and analyze pseudo code to serially capture data on port P2 and transfer it parallelly on port P1	*CO2*	*PO1*	**06**
		b)	Design and Analyze Requirements for Interfacing a Master Processor with an I/O Controller in an Embedded System	*CO3*	*PO2*	**06**
		c)	Analyze the key performance parameters which impact overall efficiency of an embedded system	*CO2*	*PO1*	**08**
			UNIT - IV			
	6	a)	Given a device with a base address of 0x5000 and an interrupt status register at offset 0x04, design an algorithm for an ISR (Interrupt Service Routine) that handles data-ready and error interrupts. Provide a detailed analysis of the steps involved.	*CO3*	*PO2*	**08**
		b)	Memory device drivers are critical for managing the interaction between the operating system and memory devices such as RAM, EEPROM, or Flash memory. Analyse the requirement and write pseudo-code to implement the same	*CO3*	*PO2*	**08**
		c)	Analyse the need for a POSIX Standard	*CO2*	*PO1*	**04**
			UNIT - V			
	7	a)	Design a basic banking application that allows for account creation, deposit, withdrawal, and balance inquiry. Write Pseudo-code and driver code and analyze the data flow through the system	*CO3*	*PO2*	**08**
		b)	Consider the code given below def example_function(): x = 10 y = 5 print(f"Sum: {x + y}") Analyse step by step execution of the code by an Interpreter and a Complier	*CO3*	*PO2*	**07**
		c)	Write a code to perform division on an IDE and provide a detailed analysis of the code execution	*CO2*	*PO1*	**05**

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