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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, M. Tech - VLSI Design and Embedded System (MECE)

Semester End Examination; June-2022

Embedded System Design

Time: 3 hrs *Max. Marks: 100*

Course Outcome

The Students will be able to:

CO1: To gain knowledge of components of Embedded systems such as system core, I/O devices, memory, communication interface, multiprocessing, and RTOS.

CO2: To obtain insight to design challenges, techniques, methodology, debugging techniques, performance criteria and non-functional requirements.

CO3: To be able to design simple Embedded systems for the practical problems and debug/test them. Also, able to prepare & present a report.

CO4: To be able to analyze Embedded systems and related issues and come up with improvised solutions through self learning and research.

***Note: I)** Answer any **FIVE** full questions, selecting **ONE** full question from each unit.*

***II)** Any **THREE** units will have internal choice and remaining **TWO** unit questions are compulsory.*

***III)** Each unit carries 20 marks.*

Q. No.	Questions	Marks	BLs	COs	POs
	UNIT - I	**20**			
1 a.	Briefly explain the characteristics of embedded computing applications.	6	L2	CO1	PO5
b.	Discuss any two advantages of microprocessor based digital system design.	4	L3	CO1	PO5
c.	Analyze the requirements of a GPS moving map and prepare a requirement form.	10	L3	CO1	PO3
	OR				
d.	Explain major levels of abstraction in embedded system design process. Also discuss the requirements for design.	10	L3	CO2	PO5
e.	Discuss different instruction sets used in ARM processor.	10	L2	CO2	PO5
	UNIT - II	**20**			
2 a.	Briefly explain how cache supports reads in memory system. Also explain a level-2 cache system.	10	L2	CO2	PO3
b.	With the help of simple code, Illustrate arithmetic operation in PIC16F and ARM processors.	10	L3	CO2	PO3
	OR				
c.	Explain the hardware architecture of a typical computing platform.	10	L2	CO2	PO5
d.	Discuss bus organization and the basic building block of bus protocol with the help of block diagram.	10	L3	CO2	PO5

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	UNIT - III	**20**			
3 a.	Write a C code to implement circular buffer and illustrate how it can store a subset of data stream.	10	L3	CO3	PO3
b.	Discuss the different debugging techniques.	10	L2	CO2	PO5
	UNIT - IV	**20**			
4 a.	Briefly explain any five basic functions of real time Kernel.	10	L2	CO2	PO5
b.	Three processes with process ID's P1, P2 and P3 with estimated completion time of 6, 4, 2 ms respectively enters ready queue together in order P1, P2, P3. Estimate process time and Turn Around Time(TAT) for each processes and average waiting time and Turn Around Time(assuming no I/O waiting) for the processes in RR algorithm with time slice = 2 ms.	10	L3	CO4	PO3
	OR				
c.	Explain in brief the "Dining Philosopher problem". Describing the synchronization issues in resource allocation and proposed solution.	10	L2	CO4	PO5
d.	Three processes with process ID's P1, P2 and P3 with estimated completion time of 10, 5, 7 ms respectively enters ready queue together. A new process P4 with estimated completion time to 2 ms enters ready queue after 2 ms of execution of P2. Assume no I/O operations are involved and estimate; i) Waiting time for each process ii) Turn Around time for each process iii) Average waiting time iv) Average turn Around time	10	L3	CO4	PO3
	UNIT - V	**20**			
5 a.	Briefly discuss the waterfall and spiral development models.	10	L2	CO5	PO5
b.	Briefly explain the concept of concurrent engineering applied to telephone system.	10	L2	CO5	PO5

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