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

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; July - 2021

Embedded Systems

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer any **FIVE** full questions.*

1	a.	What is an embedded system? Discuss the comparison between embedded system and general purpose computing system.	8
	b.	Explain the classification of embedded systems based on complexity and performance.	6
	c.	Briefly discuss different application area for embedded systems.	6
2	a.	Write a note on interfaces circuit: i) I^2C bus ii) UART	10
	b.	Define embedded firmware. Discuss various methods available for developing the embedded firmware.	5
	c.	Differentiate the RISC and CISC processors.	5
3	a.	Explain any three characteristics of an embedded system.	6
	b.	Discuss any four operational quality attributes of an embedded system.	8
	c.	Explain the different electronic control units used in automotive systems.	6
4	a.	Discuss the fundamental issues in hardware software IO design.	8
	b.	Explain the following computation model used in embedded system design: i) Data flow graph model ii) State machine model	8
	c.	List out important hardware software tradeoffs in embedded system design.	4
5	a.	Explain super loop based approach of firmware design.	8
	b.	Expalin the following with diagarm: i) Assembly language to machine language conversion process ii) High level language to machine language	12
6	a.	Explain with necessary diagram tasks, process and threads in the operating system.	6
	b.	Explain multiprocessing, multitasking and multi-programming?	6
	c.	Three processes with process IDs P_1, P_2, P_3 with estimated completion time 10, 5, 7 ms and priorities 0, 3, 2(0-highhest priority 3-lowest priority) respectively enters the ready queue together. Calculate the waiting time and TAT for each process and the average waiting time and turnaround time in priority based scheduling algorithm.	8

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7	a.	Define cross compilation. Explain the object file and hex files generated during the cross compilation.	7
	b.	Define simulators. List out the features of simulator based debugging. Mention their advantages and limitations.	8
	c.	What is debugging and why debugging is required?	5
8	a.	Explain monitor program based firmware debugging? Mention their disadvantages.	10
	b.	Explain JTAG based boundary scanning for hardware testing.	10
9	a.	What is EDLC? Why EDLC is essential in embedded product development? Mention its primary objectives.	6
	b.	Explain the various activities involved in conceptualistion phase of EDLC.	8
	c.	Explian the various activities involved in design phase of EDLC.	6
10	a.	Explain the processor trends on embedded system.	10
	b.	Explain the **.**NET based embedded application development.	5
	c.	Discuss the concepts of bottlenecks.	5

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