T.E./Elx/Sem-VI/R-19/'C' Scheme/Sub:-ES&RTOS/SH.2024

Date :- 12/12/2024

(3 Hours) [Total Marks: 80]

GP. Code:-10067530

N.B.: (1) Question No. 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) Each question carries 20 marks and sub-question carry equal marks.
(4) Assume suitable data if required.

1.	(a)	With respect to power, performance and cost state and explain the associated design metrics for an embedded system.	(5)
	(b)	. Give the significance of Watch Dog Timer and Brown Out Reset circuit.	(5)
	(c)	Compare the RMA and EDF scheduling Algorithm	(5)
	(d)	State the Interrupt Structure in Cortex-M3 and give its significance.	(5)
2.	(a)	Explain issues in H/W-S/W co-design with example .	(10)

	(b)	Explain the operation and significance of following freeRTOS functions.
		i) OSTaskCreate(); OSTaskDel;
		ii) OSInit(); & OSStart();
		iii)OSSemPend(),OSQPost( )
			(10)

3.	(a)	Explain Priority Inheritance and Priority Ceiling Protocol with Suitable Task execution Time Line Diagram.	(10)
	(b)	Justify the statement "Interrupt latency has great impact on Real Time System and predictability of Real Time Operating System Kernels.	(10)
4.	(a)	With the help of an example explain sporadic task. List and explain the various types of tasks in an embedded system.Draw the task state diagram	(10)
	(b)	Explain briefly the programmer's model of Cortex-M3 architecture and comment on its low power capability.	(10)
5	(a)	Elaborate on the Case study of Smart Watch in terms of hardware, software tasks and IPC required. Also, i. List the specifications of the system. ii. Draw a hardware block diagram iii. Justify the choice of each hardware component iv. List the software components. v. Classify the tasks into periodic, aperiodic and sporadic tasks.	(10)
	(b)	.Explain the Free-RTOS Event Management and Time Management Functions	(10)
6.	(a)	Write a short note on Hardware and Software Testing Tools.	(10)
	(b)	Explain "BUS ARBITRATION" in CAN with suitable example. Justify the statement " CAN Bus is suitable for Real Time applications"..	(10)

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