

**K. J. Somaiya Institute of Technology, Sion, Mumbai-22**  
**(Autonomous College Affiliated to University of Mumbai)**

Nov – Dec 2023

(B.Tech.) Program: EXC\_\_Scheme I/II/IIB/III: II

Examination: LY Semester: VII

Course Code: EXDLC7033\_\_ and Course Name: **Embedded Systems & RTOS**

Date of Exam: 29/11/2023

Duration: 2.5 Hours

Max. Marks: 60

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Mention the applications of embedded systems.	2	CO1	U
ii)	Define "Time-to-prototype"	2	CO1	U
iii)	List the functions of a kernel.	2	CO2	U
iv)	Define RS232C and RS485 communication.	2	CO2	U
v)	Classify the types of communication ports for I/O.	2	CO3	U
vi)	Define Thread and Process.	2	CO4	U
vii)	Define deadlock?	2	CO5	U
viii)	Define sequential Programming Model.	2	CO6	U
Q.2	Solve any four questions out of six.	16		
i)	What is the classification of Real time systems? Name the example of each.	4	CO1	U
ii)	Explain Von Neumann architecture with a diagram.	4	CO2	U

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iii)	Explain I2C bus architecture.	4	CO3	U
iv)	Compare GPOS and RTOS.	4	CO4	U
v)	Explain the inter task communication offered by RTOS.	4	CO5	U
vi)	Draw FSM for Automatic Chocolate Vending machine	4	CO6	U
Q.3	Solve any two questions out of three.	16		
i)	Explain all design metrics of embedded systems.	8	CO1	U
ii)	Three processes with process IDs P1, P2, P3 with estimated completion time 6, 4, 2 milliseconds respectively, enters the ready queue together in the order P1, P2, P3. Calculate the waiting time and Turn Around Time (TAT) for each process and the Average waiting time and Turnaround Time (Assuming there is no I/O waiting for the processes) in RR algorithm with Time slice= 2ms	8	CO4	Ap
iii)	What is mutex? What is the difference between mutex and binary semaphore?	8	CO5	U
Q.4	Solve any two questions out of three.	16		
i)	Explain all processor modes in the Current Program Status Register (CPSR)	8	CO2	U
ii)	Draw and explain fields in a CAN frame.	8	CO3	U
iii)	Explain UML (Unified Modeling Language) with suitable examples	8	CO6	U

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