# B.E. (Computer Engineering)
# EMBEDDED AND REAL TIME OPERATING SYSTEM
## (2015 Course) (Elective - III) (Semester - II) (410252(C))

*Time : 2½ Hours]*                                          *[Max. Marks : 70*

*Instructions to the candidates:*

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume suitable data if necessary.*

*Q1)* a) What is the use of ROM image in Embedded system? Draw a structure of ROM image and explain various components embedded inside it. **[5]**

b) How does ARM micro-controller differ from a SHARC processor? Justify your answer. **[5]**

OR

*Q2)* a) Describe in detail different forms of memories and their use in embedded systems. **[5]**

b) To design sophisticated embedded systems for high computing performance, which performance metrics are used? Explain. **[5]**

*Q3)* a) Explain types of serial communication with examples. **[5]**

b) Enlist various Internet enabled system protocols and explain one with its features. **[5]**

OR

*Q4)* a) Explain why PCI/X buses are used for high speed data transfer? List the major features of PCI/X bus. **[5]**

b) Describe and compare RS232C and SDIO Devices. **[5]**

*Q5)* a) How to represent Precedence constraints and data dependency among real-time tasks? Explain with diagram. **[6]**

b) How Rate Monotonic (RM) algorithm checks the schedulability of tasks? What are limitations of RM algorithm. **[6]**

c) What is RTOS? Differentiate Hard versus soft real-time systems and their timing constraints. **[4]**

OR

***P.T.O.***

*Q6)* a) Differentiate between fixed priority and dynamic priority scheduling algorithms in real-time systems. Give one example of each. **[6]**

b) What are various Temporal parameters of real-time processes? List and explain. **[6]**

c) What are various Real-time requirements in the domain of Signal processing or Multimedia. **[4]**

**Q7)** a) With the help of example, demonstrate the concept of critical section.**[6]**

b) What is priority inversion problem in real-time systems? How this problem can be solved? Give details. **[6]**

c) What is interrupt latency? Justify its role in handling interrupts in RTOS environment. **[4]**

OR

*Q8)* a) Explain with example Resource conflicts and blocking. **[6]**

b) What is Semaphore? How does it help in resource sharing in RTOS Kernel? **[6]**

c) How interrupts are handled in RTOS environment? **[4]**

*Q9)* a) Draw and explain model of real-time communication with related terminologies. **[6]**

b) Explain priority-based service disciplines for switched networks in multiprocessor systems for real-time communication. **[6]**

c) Describe the embedded software development process. **[6]**

OR

*Q10)*a) What are issues in resource reservation. Explain Resource reservation protocol with diagram. **[6]**

b) Explain with example Validation and debugging in an embedded system. **[6]**

c) List capabilities of commercial real-time operating systems. Enlist the features of RTLinux. **[6]**

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