B.E. Electronics & Communication / Telecommunication Engineering (Model Curriculum)
Semester - VII

# PEC-2 / ET704M-2 - Embedded Systems Design

P. Pages : 2 **GUG/S/23/14251**

Time : Three Hours * 2 9 6 7 * Max. Marks : 80

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Notes : 1. All Questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

**1.** a) Explain the steps in embedded system design? **8**

b) Explain common design metrics of an embedded system. **8**

**OR**

**2.** a) Draw and explain block diagram of LPC2138. **8**

b) What is an embedded system? Explain components of embedded system hardware? **8**

**3.** a) Define **8**
i) System Register Set (SRS) ii) Instruction Queue (IQ)
iii) Prefetch Control Unit (PFCU) iv) Floating Point Register Set (FRS)

b) What is DMA controller? Explain DMA controller with the buses and control signals in between DMA channels on chip. **8**

**OR**

**4.** a) What is memory management? Draw explain memory map for Princeton architecture and Harvard architecture. **8**

b) Explain the essential characteristics of processor structure. **8**

**5.** a) What are the main features of the source code engineering tool for embedded C/C++. **8**

b) How and when are the following used in a C program. **8**
a) #define b) typedef
c) null pointer d) Passing the reference
e) recursive function

**OR**

**6.** a) Explain the importance of the following declarations in embedded C **8**
i) Static ii) Volatile iii) Interrupt

b) What are the criteria by which an appropriate programming language is chosen for embedded software of a given system? **8**

**7.** a) What is semaphore? Explain Resource synchronization and task synchronization techniques of semaphore. **8**

b) What is task scheduling? Classify real time task scheduling algorithm. **8**

**OR**

**8.** a) What is Rate Monotonic Algorithm (RMA). What are the issue in using RMA in practical situation? **8**

b) What do you understand by the term "real time system". Using a block diagram show the important hardware components of a real time system and their interactions. Explain the role of the different components. **8**

**9.** a) With respect to block diagram, memory and processor explain smart card design. **8**

b) Explain in details. **8**
a) Process
b) Task
c) Threads

**OR**

**10.** a) Explain the following functions of $\mu cos-ii$ operating system. **8**
i) Task related functions
ii) Timer related functions

b) Explain in details about the inter-process communication and context switching. **8**

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