

**ET704M-PEC-2 - Embedded Systems**

P. Pages : 2

Time : Three Hours



**GUG/W/22/14251**

Max. Marks : 80

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

1. a) What is an embedded system? Explain components of embedded system hardware? **8**  
b) Draw and explain block diagram of LPC2138. **8**

**OR**

2. a) Explain the techniques used for selection of memory in embedded system. **8**  
b) Explain the steps in embedded system design? **8**  
3. a) Draw and explain the structural units at a processor in the embedded system. **8**  
b) What is memory management? Draw and explain memory map for Princeton architecture and Harvard architecture. **8**

**OR**

4. a) What is DMA controller? Explain DMA controller with the busses and control signals in between DMA channels on chip. **8**  
b) Discuss about the factors to be considered for selection of processor in embedded system. **8**  
5. a) Draw and explain programming model of an embedded system in which there are three software timers in an active list. **8**  
b) Explain the importance of the following declarations in embedded C **8**  
i) Static                      ii) Volatile                      iii) Interrupt.

**OR**

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

- b) Discuss about task and task states in Real time operating systems. **8**

**OR**

- 8.** a) What is task scheduling? Classify real time task scheduling algorithm. **8**
- b) Explain the operation of priority ceiling protocol (PCP) in sharing critical resources among real time task. Explain how PCP is able to avoid deadlock, unbounded priority inversions and chain blockings. **8**
- 9.** a) With respect to block diagram, processor, memory, inter processor communication, algorithm and s/w architecture explain design of digital camera. **8**
- b) Explain the following functions of  $\mu$ cos-ii operating system. **8**
- a) Task related functions
- b) Timer related functions.

**OR**

- 10.** a) Explain in details. **8**
- a) Process
- b) Task
- c) Threads
- b) Explain in details about the inter-process communication and context switching. **8**

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