Ref No: EX/PG/DMC/T/1210C/12/2024

M. Tech. Distributed & Mobile Computing Examination, 2024

1st year 2nd Semester

SUBJECT: - Embedded Systems

Time: 3 hours Full Marks: 100

Answer any ***five*** from the questions below.

1) a) What is an embedded system? Mention the various components of embedded systems.
   b) What are the differences between a microcontroller and a microprocessor?
   c) What are the applications of an embedded system?
   d) State the difference between RISC and CISC architecture. (2+4)+6+4+4

2) a) Draw and compare von-Neumann and Harvard architecture.
   b) Define Interrupt latency. How is it handled?
   c) What are the various challenges faced by designers of embedded systems?
   d) Describe in detail about the data transfer mechanism using DMA in Embedded System. 4+(2+4)+5+5

3) a) Difference between segmentation and paging. When does a segmentation fault occurs?
   b) What is RTOS? What are soft and hard RTOS? Explain with examples.
   c) What are the various characteristics of RTOS? Explain the concept of task priority inversion in RTOS? (4+2)+(2+4)+4+4

4) a) What are the advantages of using an RTOS in embedded systems?
   b) Explain the concept of priority inheritance in RTOS?
   c) How does an RTOS handle task priorities and task starvation?
   d) Discuss the concept of task deadlines, delay and duration in real-time systems. 4+4+6+6

5) a) Compare RMA and EDF scheduling algorithm.
   b) What is the impact of fixed partitioning on fragmentation?
   c) What is meant by virtual memory? What happens when there is a page fault? How is it handled by OS?
   d) What is thrashing? When does it happen and how does it affect performance? 4+3+(3+2+3)+(2+3)

6) a) What are various types of bus? What are the classifications of I/O devices?
   b) What is synchronous communication? What are the two characteristics of synchronous communication?
   c) Mention some advanced bus standard protocols. Explain the functions of a parallel I/O interface. (3+3)+(4+4)+(3+3)

7) Write short notes on: 5x4
   a) Bus arbitration
   b) PCI
   c) MMU
   d) ARM registers
   e) Pipeline structure in ARM
   f) Different condition flags of ARM