

Total No. of Questions : 12]

SEAT No. :

P1457

[4759] - 214

[Total No. of Pages :4

B.E. (Computer Engineering)

EMBEDDED SYSTEMS

(2008 Course) (Semester - I) (Elective - II) (410445)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section - I & Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section - II.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Assume suitable data, if necessary.*

SECTION - I

- Q1)** a) Explain how Digital Signal processor and Media processor are different than a general purpose processor. [6]
- b) Which functional features in the processor architecture make it known as an 'Embedded processor'? [6]
- c) Discuss recent trends in embedded systems development in terms of processors and tools. [6]

OR

- Q2)** a) Which factors decide the complexity of Embedded Systems? Enlist different classes of Embedded Systems based on complexity. [6]
- b) What are different application areas of Embedded Systems? Give examples. [6]
- c) Discuss various components in layered architecture of Embedded Systems. [6]

- Q3)** a) Discuss various operating modes of ARM architecture based processor. [6]

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- b) Discuss various ways of Power management in an Embedded System.[6]
- c) What is the importance of Watchdog Timer in an Embedded System?[4]

OR

- Q4)** a) A Mobile Phone system is to be designed. For this application, select the appropriate processor based on [8]
- i) Instruction cycle time
 - ii) Bus width
 - iii) MIPS
 - iv) On chip cache
 - v) On chip RAM/ROM.
- b) Discuss few advanced structural units in a processor and their impact on performance of a processor. [4]
- c) Differentiate between ARM7 and ARM9 architectures. [4]

- Q5)** a) Which topology is used by devices to communicate through USB protocol? Discuss the data transfer mechanism using USB protocol in details. [8]
- b) Describe various optical devices commonly used in Embedded Systems. Also mention their applications. [4]
- c) What are data converters? What is their significance in Embedded Systems? [4]

OR

- Q6)** a) Discuss CAN protocol w.r.t. following points: [8]
- i) Standard data frame format
 - ii) Arbitration Mechanism
 - iii) Different types of frames
 - iv) Bit stuffing
- b) Discuss the I²C protocol used to transfer data between two devices in details. How arbitration takes place in the system? [8]

SECTION - II

- Q7)** a) Discuss various debugging tools used in developing an embedded system. [6]
- b) What is In-Circuit-Emulator? Give details. [6]
- c) Explain the process of converting an assembly program into a file for ROM image. [6]

OR

- Q8)** a) Explain the process of converting a C program into a file for ROM image. [6]
- b) Explain the use of data structures namely stack and tree in brief. [6]
- c) How Java is useful in embedded system programming? Also mention its disadvantages. [6]

- Q9)** a) Compare the following scheduling models of RTOS, based on worst case latency: [6]
- i) Cooperative Round Robin
- ii) Cooperative ordered list.
- iii) Cooperative Time slicing (Rate monotonic).
- b) What care must be taken to eliminate shared data problem? [6]
- c) Differentiate between RTOS and embedded OS. [4]

OR

- Q10)** a) Discuss different ways in which interrupts are handled in RTOS environment. [6]
- b) What are virtual device drivers? Explain. [6]
- c) Compare assembly language programming and high level language programming. [4]

- Q11)a)** Give details of hardware and software components of mobile phone. **[4]**
- b) Write short notes on any three. **[12]**
- i) μ COS - II
 - ii) Vx Works
 - iii) Embedded Linux
 - iv) Special OS features for automotive systems.

OR

- Q12)a)** Explain Automatic cruise control system with respect to hardware and software components. **[8]**
- b) Differentiate between Embedded OS and desktop OS. **[4]**
- c) Differentiate between soft real time operating system and hard real time operating system. **[4]**

