

Total No. of Questions : 12]

SEAT No. :

P3016

[Total No. of Pages : 3

B.E. (Semester - I)
COMPUTER ENGINEERING
Embedded Systems
(2008 Pattern) (Elective - II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer to the two sections should be written in separate books.*
- 2) *In section I attempt : Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6. In Section II attempt : Q. No. 7 or Q. No. 8, Q. No. 9 or Q. No. 10, Q. No. 11 or Q. No. 12.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of Calculator is allowed.*
- 6) *Assume suitable data if necessary.*

SECTION - I

- Q1)** a) Which factors decide the complexity of Embedded Systems ? Enlist different classes of Embedded Systems based on complexity. [6]
- b) What is the need of using ASSP and SoC in embedded systems? [6]
- c) Discuss various processors which can be used as GPP in embedded systems. Mention broad application areas suitable for each. [6]

OR

- Q2)** a) Discuss recent trends in embedded systems development in terms of processors and tools. [6]
- b) Explain different steps in Embedded system design process. [6]
- c) Draw a layered architecture of Embedded system. Discuss various components in Embedded System. [6]
- Q3)** 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 the Register Organization in ARM7 processor with the help of diagram. [8]

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OR

- Q4)** a) Describe different types of interrupts used in ARM7 processor. [6]
b) What are the key deciding factors in reducing power consumption in an embedded system? [6]
c) Discuss various types of memories used in Embedded systems. [4]
- Q5)** a) Discuss the I²C protocol used to transfer data between two devices. How arbitration takes place in the system? [8]
b) Discuss USB protocol w.r.t following points [8]
i) Topology.
ii) Arbitration.
iii) Types of Data Transfer.

OR

- Q6)** a) Enlist the features of CAN protocol. Discuss the frame format used for data transfer. [6]
b) What are data converters? Describe the role played by them in embedded systems. [6]
c) Compare RS232 and RS485 standards. [4]

SECTION - II

- Q7)** a) Explain the process of converting a C program into a file for ROM image. [6]
b) How Java is useful in embedded system programming? Also mention its disadvantages. [6]
c) What is In-Circuit-Emulator? [6]

OR

- Q8)** a) Explain the process of converting an assembly program into a file for ROM image. [6]
b) How cross compilers are different than compilers? [4]
c) With the help of neat diagram, explain software development cycle for

embedded system. [8]

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 are virtual device drivers? Explain. [6]

c) Differentiate between RTOS and embedded OS. [4]

OR

Q10) a) When the scheduling is needed in embedded system software? Also explain preemptive scheduling model used in RTOS. [10]

b) Name and explain in brief any three IPC mechanisms used for process synchronization. [3]

c) Name two advanced scheduling algorithms. [3]

Q11) a) Explain IP phone with respect to hardware and software components. [8]

b) Differentiate between soft real time operating system and hard real time operating system. [4]

c) Discuss different features of Micro C/OS-II. [4]

OR

Q12) a) Discuss different applications based on VxWorks. Also give its features [6]

b) Give details of hardware and software components of digital camera. [6]

c) Differentiate between RTOS and desktop OS. [4]

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