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Seventh Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
Embedded Computing Systems

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. Define embedded system. What are the characteristics and constraints of an embedded system? (06 Marks)
- b. List and explain different types of memories used in embedded system with their functions. (06 Marks)
- c. Discuss briefly the challenges faced in designing of an embedded system. (08 Marks)
- 2 a. What are the different classifications of embedded system? Mention the tools used in the development of each type of embedded system. (06 Marks)
- b. Distinguish between three modes of serial communication 'Synchronous', 'Asynchronous' and 'Iso – synchronous'. (06 Marks)
- c. Describe the internal serial communication ports available in 68HC11 microcontroller. (08 Marks)
- 3 a. What is a watch dog timer? Mention its applications. (04 Marks)
- b. Describe the features of CAN bus. Mention the function of each field in a CAN frame. (08 Marks)
- c. Describe the features of
 - i) PCI bus
 - ii) Blue tooth. (08 Marks)
- 4 a. Give examples of interrupts that can arise from the following sources and briefly explain their use :
 - i) Internal hardware device sources
 - ii) External hardware device with internal vector address generation
 - iii) Software error related sources
 - iv) Software instruction – related sources. (08 Marks)
- b. Define context, interrupt latency, interrupt service deadline. (06 Marks)
- c. What is DMA? Explain the working of DMA controller with a block diagram. (06 Marks)

PART – B

- 5 a. Write and explain DFG for an output sequence y_6 of a FIR filter, where $y_n = \sum a_i x_{n-i}$. (04 Marks)
- b. With an example, explain FSM model. (06 Marks)
- c. Distinguish between function, task and ISR based on their characteristics. (10 Marks)
- 6 a. What is meant by user mode and supervisory mode of operation? Discuss in brief. (04 Marks)
- b. What is kernel? List and explain the services it provides. (08 Marks)
- c. Discuss different types of memory management strategies used by RTOS. (08 Marks)

- 7 a. Define hard real time and soft real time systems. Give an example for each. (06 Marks)
b. Describe the rate monotonic scheduler used in RTOS. What are its disadvantages? (06 Marks)
c. What are the methods used by the RTOS for saving and optimizing power in an embedded system. (08 Marks)
- 8 a. Describe in brief, the following tools used in development of embedded system
i) Source code engineering tool
ii) Integrated development environment tool
iii) Simulator
iv) In-circuit emulator. (08 Marks)
b. Explain the working of a device programmer, with a diagram. (08 Marks)
c. What are the different metrics used for measuring the performance of an embedded system. (04 Marks)
