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B. Tech
PECS 3405

Eighth Semester Examination – 2007

EMBEDDED SYSTEM

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory
and any **five** from the rest.*

*The figures in the right-hand margin indicate full
marks of the questions.*

1. Answer the following questions : 2×10
- (a) What do you mean by NRE cost in a system design ?
 - (b) Name at least two essential units in an embedded processor. 20, EV
 - (c) What is an embedded system ?

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- (d) Explain the difference between port-based I/O and bus-based I/O.
 - (e) What do you mean by interrupt latency ?
 - (f) What do you mean by priority inversion ?
 - (g) Why cross compilers are needed in designing an embedded system ?
 - (h) What is a process ?
 - (i) What do you mean by hierarchical RTOS ?
 - (j) What is the difference between subroutine and interrupt service routing ?
2. (a) How an embedded system differs from other computing system ? What are the challenges in designing such a system ? 5
- (b) Give two examples of embedded systems and illustrate any one of them. 5
3. (a) Illustrate and difference between hard real time and soft real time system. Give an example of each system. Which of the two system is harder to design ? Justify your answer. 5

- (b) Enumerate the sequence of events that takes place in interrupt handling. 5
4. (a) Compare the advantages and disadvantages of data transfer using serial and parallel port. 5
- (b) How a ISA bus architecture differs from that of PCI bus architecture ? 5
5. (a) In what respect a real-time operating system differs from the conventional operating system such as Window or Unix. 5
- (b) Enumerate the tests needed in a real-time system. 5
6. (a) Identify the bug that exist in the following code fragment. [Hint : Task1 and Task2 are sharing the variable **Error** through the subroutine call **CountError**]. 5

```

void Task1 (void)      void Task2 (void)
{
    CountError (9)    CountError (11)
}
}

static int Error
void CountError(int NewError)
{
    Error += NewError
}

```

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- (b) What do you mean by plug and play devices ? Explain any protocol that supports plug and play feature. 5
7. (a) What problem might occur in a shared memory process communication ? How can you overcome that problem ? Illustrate your answer with an example. 5
- (b) What are the advantages of time slice scheduling in an RTOS ? 5
8. (a) What are the design and co-design issues in embedded system development process ? 5
- (b) What is the need of a well tested and debugged RTOS ? 5