Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech/ME (IT)/SEM-2/PGEIT-201/2010

2010

EMBEDDED COMPUTER SYSTEM

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer Question No. 1 and any *four* from the rest.

1. Answer any *five* of the following : 5 × 2 = 10

   i) What are the important features of HW/SW Co design ?

   ii) What do you mean by system specifications for designing an embedded system ?

   iii) What are the advantages of FPGAs over ASICs and vice-versa ?

   iv) What do you understand by the term MIPS, FLOPS and CPI ?

   v) What are the important features of a logic analyzer ?

   vi) Why is a CRO not adequate for testing embedded system ?

2. What is embedded system ? Why Embedded system so important ? Give ten examples of embedded system in your daily life. What are the temporal requirements of Embedded systems ? What are the significance of *Y*-Chart ?

3 + 2 + 5 + 2 + 3

3. Explain the different hardware and software issues in designing an Embedded systems. Give and explain the flow chart of Embedded system Development Cycle. 10 + 5

4. What are the characteristics of a priority driven scheduling algorithm ? An "EDF algorithm is a dynamic priority algorithm". Explain with the example. What is weighted Round Robin scheduling ? 3 + 10 + 2

5. a) FPGA and CPU both are programmable devices. Then what are the advantages of FPGAs over CUPs ?

   b) Let's assume that an FPGA is connected with a microprocessor as a co-processor. Bit-streams of different functions are stored in an EPROM. Whenever the microprocessor needs the FPGA to execute a particular function it issues a command to a logic circuit which in turn generates the appropriate acknowledgement signal to the microprocessor. Draw the block diagram of such a configuration indicating all the necessary signals that will be generated by the logic circuit and explain is operations.

   c) Explain the general architecture of FPGA. 3 + 7 + 5

6. a) What are the advantages of DSP over Analog Signal Processing ? Give the some difficulties of DSP. Draw and explain the block diagram of DSP processor.

   b) Give a generalized block diagram to show how a processor will be interfaced with I/O subsystems ?

   c) Why is RTOS used in some Embedded Systems ?

   9 + 5 + 1

7. a) What are the different testing phases for designing an Embedded system ? Indicate the different testing tools.

   b) What is JTAG ? How does a Basic Boundary Scan Cell (BSC) work ?

   c) What is ICE (In-Circuit Emulator) ? 5 + 7 + 3