ROLL NO. _____

Code: CT74 **Subject: EMBEDDED SYSTEMS**

ALCCS

Time: 3 Hours **FEBRUARY 2014** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1 a. Explain any four characteristics of embedded systems. **(7×4)**

b. Describe the functioning of microcontroller.

c. Discuss the features of write ability and storage performance of memory.

d. Explain the process of A/D and D/A converters.

e. Explain concurrent process model. Give an example with illustration.

f. Explain the role of debuggers and emulators in embedded systems.

g. Give the advantages of networked embedded systems.

Q.2 a. Discuss the functioning of Application-Specific Instruction-Set Processors (ASIPs) and Digital Signal Processors (DSPs) in embedded systems. **(6)**

b. Describe the basic architecture of general-purpose processor.Explain the features of data sub-system and control sub-system. **(6)**

c. Explain the features of System-on-Chip (SoC) and give the relevant block diagram. **(6)**

Q.3 a. Compare the characteristic features of ROM, Mask-Programmed ROM and One-Time Programmable ROM. **(6)**

b. Explain the features of the following: **(6)**

(i) Memory hierarchy

(ii) Cache-Replacement Policy

(iii) Processor and memory interface

c. Draw the architecture of DRAM. Mention various types of DRAMs and give their respective features. **(6)**

Q.4 a. Compare the strobe and handshake control protocols used in interfacing. Draw the respective waveforms. **(6)**

b. Explain interrupt driven I/O for the following: **(6)**

(i) Fixed ISR location

(ii) Vectored interrupt

c. Explain briefly the process of parallel communication and serial communication in embedded systems. **(6)**

Q.5 a. Explain how the program optimization improves the performance of embedded system. **(6)**

b. Explain the features of Real-Time Operating Systems (RTOS) in detail. **(6)**

c. Explain any three interprocess communication methods used in embedded system design. **(6)**

Q.6 a. Describe the features of the following wired protocols used in embedded systems: **(9)**

(i) I^2C

(ii) Controller Area Network (CAN)

(iii)PCI bus protocols

b. Describe the features of the following wireless protocols used in embedded systems: **(9)**

(i) IrDA

(ii) Bluetooth

(iii)IEEE 802.11

Q.7 a. Explain the design development tools used in embedded systems. **(6)**

b. Write short notes from any **FOUR** of the following. **(4×3)**

(i) Performance design metrics in embedded system

(ii) Power management in embedded system

(iii) Fault tolerance in embedded system

(iv) Process control applications of embedded system

(v) Multimedia applications of embedded system