Code: DE67 / DC67   **Subject: EMBEDDED SYSTEMS**

DipIETE – ET/CS

Time: 3 Hours | **DECEMBER 2012** | **Max. Marks: 100**

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

NOTE: There are 9 Questions in all.
- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

a. The Processor technology relates to the architecture of the

    (A) Memory Blocks   **(B)** Computation Engine
    (C) IO Blocks   **(D)** All of these

b. A logic synthesis tool converts Boolean expressions into a connection of

    (A) Logic gates   **(B)** RT Components
    (C) Register Transfers   **(D)** All of these

c. The advantages of Mask –Programmed ROM are

    (A) Density   **(B)** Speed
    (C) Low Write Ability   **(D)** All of these

d. A program that runs on one processor and executes the instructions of another processor is called

    (A) Distributed processor   **(B)** Single-purpose processor
    (C) Instruction-set Simulator   **(D)** All of these

e. To overcome the limitation of polling, most microprocessors come with a feature called

    (A) External Interrupt   **(B)** Internal Interrupt
    (C) Vectored Interrupt   **(D)** All of these

f. The I^{2}C and CAN bus protocols are designed for

(A) Interfacing IC's   **(B)** Interfacing Buses
(C) Interface IO's   **(D)** All of these

g. The linker operates on the object files created by the assembler and modifies the assembled code to make the necessary links between files.

(A) True   **(B)** False
(C) Not linker, it's Loader   **(D)** Both linker and Loader

h. A LCD driver function is

(A) To excite the LCD dots   **(B)** To excite the LCD characters
(C) To manage LCD action   **(D)** Both **(A)** and **(B)**

i. Interconnect networks have been developed especially for distributed embedded computing are

(A) I^{2}C   **(B)** CAN
(C) Ethernet   **(D)** All of these

j. In a Timer, the minimum interval it can measure is called

(A) Sensitivity   **(B)** Accuracy
(C) Both **(A)** and **(B)**   **(D)** Resolution

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain why single-purpose processors (hardware) and general purpose processors are essentially the same and then describe how they differ in terms of design metrics. **(8)**

   b. Define Moore's law? Explain co-design ladder in embedded system. **(8)**

Q.3 a. Design a sequential logic circuit to construct a pulse divider. Slow down your pre-existing pulse so that you output a 1 for every four pulse detected. **(10)**

   b. Explain the different methods of Optimizing the FSMD. **(6)**

Q.4 a. Draw and explain the general purpose processor architecture. **(8)**

   b. Explain the different addressing modes of assembly language. **(8)**

Q.5 a. Given an analog I/P signal whose voltage ranges from 0 to 15V and 8-bit digital encoding, calculate the correct coding of 5V. **(8)**

   b. Draw hardware structure to control a stepper motor using 8051 driver. **(8)**

Q.6 a. Explain advanced DRAM designs with suitable diagram. **(10)**

   b. Explain the memory write ability/storage permanence. **(6)**

Q.7 a. Explain the basic concepts of communication protocols with example. **(8)**

   b. Compare Memory-mapped I/O vs. Standard I/O techniques. **(8)**

Q.8   Write short notes on:
            (i) Reentrancy
            (ii) Semaphore Problems **(2×8)**

Q.9 a. Draw the state diagram of TCP stack generation. **(8)**

   b. Draw and explain software architecture of Automatic Chocolate Vending Machine. **(8)**