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

DipIETE – ET/CS

Time: 3 Hours   **DECEMBER 2014**   **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 state minimization is the

(A) Removing Equivalent States   (B) Merging Equivalent States
(C) State Encoding   (D) None of these

b. Debuggers are also known as

(A) Instruction set simulators (ISS)   (B) Virtual Machine (VM)
(C) Both (A) and (B)   (D) None of these

c. The difference between Synchronous and Enhanced Synchronous DRAM is

(A) Clocking   (B) Bus Size
(C) Control Signals   (D) None of these

d. Which of the following statement is true?

(A) DRAM is faster than SRAM
(B) SRAM is easily implemented on the same IC as processors
(C) DRAM is easily implemented on the same IC as processors
(D) Both (A) & (C)

e. The non-volatile memory element is

(A) DRAM   (B) FPM DRAM
(C) Both (A) and (B)   (D) NVRAM

f. The data transfer rate of I^2C 7-bit addressing is

(A) 3.4 Mbits/s   (B) 100 Kbits/s
(C) 400 Mbits/s   (D) 1.5 Mbits/s

g. The examples of wireless protocols are

(A) IrDA   **(B)** Bluetooth
(C) CSMA/CA   **(D)** All of these

h. The Scheduler in the RTOS runs the

(A) Ready TASK & SEMAPHORES
(B) Highest –priority Interrupt
(C) Highest –priority ready Semaphores
(D) Highest –priority ready task

i. The fastest and simplest method for Inter-task Communication is

(A) Semaphores   **(B)** Events
(C) Queues   **(D)** Both (B) & (C)

j. While using RTOS's, avoid creating and destroying Tasks because

(A) It occupies more storage   **(B)** It does not have public data
(C) It consumes more time   **(D)** None of these

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

Q.2 a. What is a "market window" and why it is so important for products to reach the market early in this window?   **(8)**

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

Q.3 a. Design a combinational circuit for a problem "y is 1 if a is 1, or b and c are 1, z is 1 if b or c is 1, but not both".   **(8)**

   b. Explain the different methods of Optimizing the FSMD.   **(8)**

Q.4 a. Why composing of larger memory is required from smaller memory parts? Explain, how you will approach this method?   **(8)**

   b. Draw and explain the general purpose processor architecture.   **(8)**

Q.5 a. Explain the features of Timers, Counters and Watchdog Timers.   **(8)**

   b. Given an analog input signal whose voltage is ranging from 0 to 15V, and an 8-bit digital encoding. Calculate the correct encoding of 5V using Successive Approximation.   **(8)**

Q.6 a. Explain all memories write ability/ storage permanence.   **(8)**

     b. Draw the SRAM and DRAM circuit structures and list their main features.

                                                  (8)

Q.7 a. Draw the timing diagram for a bus protocol that is handshaked non addressed and transfer 8 bits of data of over a 4 bit data bus.   **(8)**

     b. Discuss the advantages and disadvantages of using memory-mapped I/O versus standard I/O.   **(8)**

Q.8 a. Explain the Process and Task concepts in RTOS.   **(8)**

     b. Explain in brief, comparison of the methods for Inter-task communication. **(8)**

Q.9 a. Draw the state diagram for automatic chocolate vending machine (AVCM) tasks.   **(8)**

     b. Draw and explain block diagram of AVCM hardware including microcontroller.   **(8)**