ROLL NO. _____

Code: AE68 **Subject: EMBEDDED SYSTEMS DESIGN**

AMIETE – ET (NEW SCHEME)

Time: 3 Hours **JUNE 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. Which of the following are not the characteristics of embedded system?

(A) Singled functioned **(B)** Tightly constrained
(C) Reactive and real time **(D)** Chip area

b. Digital circuit design to execute exactly one program is called

(A) Microprocessor **(B)** Single-purpose processor
(C) Parallel processor **(D)** Digital processor

c. Task of assigning a unique bit pattern to each state in an FSM is called

(A) Block encoding **(B)** State encoding
(C) Task encoding **(D)** State minimization

d. The processor on which we write and debug the program is called

(A) Development processor **(B)** Target processor
(C) Multiprocessor **(D)** None of the above

e. Reaction timer is one

(A) Which measures the time that an event takes to respond
(B) Measures the overall time
(C) Measures the time taken by an event to stop
(D) Measures the time taken by an event to start

f. The ability of memory to hold its stored bits after those bits have been written is called

(A) Write ability **(B)** Storage performance
(C) Write capacity **(D)** Storage capability

g. In rotating priority arbitration the arbiter changes priority of peripherals based on

(A) The priority of the peripherals
(B) First come first serve basis
(C) The history of servicing of those peripherals
(D) Last in first out basis

h. Semaphore associated two functions are

(A) Take and release **(B)** Take and stop
(C) Run and release **(D)** None of these

i. PCI bus is used for

(A) Interconnecting chips
(B) Connecting expansion boards
(C) Connecting processing memory subsystems
(D) All of the above

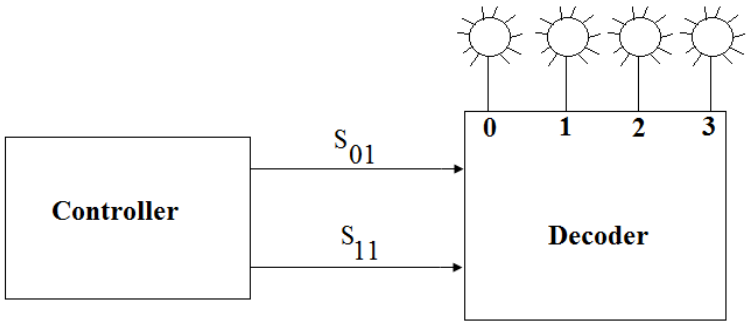
j. Which one of the following is not a wireless protocol

(A) IrDA **(B)** Bluetooth
(C) IEEE 802.11 **(D)** RS232

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

Q.2 a. Explain in detail the common characteristics that distinguish embedded from other systems **(6)**

b. Four lights are connected to a decoder. Build a circuit that will blink the lights in the order 0,2,1,3,0,2, …. **(10)**
Start from a state diagram, draw the state table, minimize the logic, and draw the final circuit.



Q.3 a. Explain in detail general software design tools that are used to design, test and debugging of software. **(10)**

b. What are the different varieties of ASIP's? Explain each how they can be used in today's embedded applications. **(6)**

Q.4 a. With examples explain different timer structures. **(10)**

b. Determine the values for SMOD and TH1 to generate a baud rate of 9600 for 8051 microcontroller, assuming 11.981MHz oscillator. **(6)**

Q.5 a. Explain in detail different types of RAM memory. **(8)**

b. Given a 2-level cache design where the hit rate are 88% for the smaller cache and 97% for the larger cache, the access cost for a miss are 12 cycles and 20 cycles respectively and the access cost for a hit is one cycle. Calculate the average cost of success. **(8)**

Q.6 a. Explain in detail priority arbiter and Daisy-chain Arbitration. **(8)**

b. Write short notes on **(8)**

(i) Wireless communication
(ii) Layering
(iii) Error detection and correction
(iv) Parallel communication

Q.7 a. Define the term reentrancy? What are the three rules that decide the function is reentrant. **(4)**

b. Explain with an example (program) what is shared-data problem and how it can be overcome using semaphore. **(12)**

Q.8 a. Compare the different methods used for Intertask communication. **(8)**

b. How does the RTOS know how to set up the timer hardware on my particular hardware? **(4)**

c. How accurate are the delays produce by the RTOS delay functions? **(4)**

Q.9 a. Explain in general the techniques used to save memory space. **(10)**

b. Write short notes on the following: **(6)**

(i) Advantages in using large number of tasks
(ii) Saving power