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Eighth Semester B.E. Degree Examination, June / July 2014

Embedded System Design

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Prove that for any rise angle the percentage revenue loss is,

$$\left\{ \frac{D(3W - D)}{2(W^2)} \right\} * 100\%$$
(08 Marks)
- b. Explain the three main processor technologies that can be used with embedded system. Also high light the benefits of each. (06 Marks)
- c. Explain ideal top-down design process. (06 Marks)
- 2 a. Write a simple algorithm for finding the GCD of two integer numbers. Write the FSM D for this algorithm. Explain how it can be optimized. Write the optimized FSM D and its advantage. (10 Marks)
- b. Design a combinatorial logic for y and z where y is '1', if a is '1' or 'b' and 'c' are '1' and z is '1' if 'b' or 'c' is '1', but not both (or a, b, and c are all '1') (10 Marks)
- 3 a. Describe the working of PWM unit with timing diagrams. How can it be used for speed control of DC motor? (10 Marks)
- b. In successive approximation ADC, calculate the correct encoding of 1.2 V, given an analog signal whose voltages ranges from -5 to +5 V and a 8-bit digital encoding. (10 Marks)
- 4 a. What is memory hierarchy? How does the cache operate? Discuss the cache mapping technique. List the merits and demerits. (10 Marks)
- b. Describe the I²C and IEEE 802.11 protocols. (10 Marks)

PART – B

- 5 a. Explain shared data problem with necessary pseudo codes. How interrupts can solve this problem? (10 Marks)
- b. Discuss how shared data problem can be solved without interrupts. (10 Marks)
- 6 a. List the characteristics of four software architectures available for building embedded software. (08 Marks)
- b. Explain the simplest round robin architecture. List out the problems that makes if inadequate for many other systems. (12 Marks)
- 7 a. Discuss : (i) Function queue scheduling architecture.
(ii) Real time operating system architecture. (08 Marks)
- b. How sharing data among RTOS tasks can create shared-data problems? Explain with necessary example. (08 Marks)
- c. With necessary diagram, briefly describe different task states in RTOS. (04 Marks)
- 8 a. Explain message queues with an example. (06 Marks)
- b. Explain encapsulating semaphores with an example. (06 Marks)
- c. Explain few techniques to save memory space in embedded systems. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.