

**FACULTY OF ENGINEERING****B.E. 4/4 (CSE) I – Semester (Old) Examination, July 2014****Subject: Principles and Applications of Embedded Systems****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part A. Answer any five questions from Part B.****PART – A (25 Marks)**

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|----|--|---|
| 1  | Distinguish between Micro Processors and Microcontrollers.   | 3 |
| 2  | Mention different types of 8051 interrupts.  | 3 |
| 3  | List the SFR's of 8051.  | 2 |
| 4  | Write assembly code for 8051 controller to square the contents of R5 and store the result in R0 (high byte) and R1 (low byte). | 3 |
| 5  | Demonstrate the purpose of a Semaphore with an example.  | 3 |
| 6  | What is Interrupt Latency?   | 2 |
| 7  | Give an example of embedded operating system.  | 2 |
| 8  | What is reentrancy give an example?  | 3 |
| 9  | What is an Emulator?   | 2 |
| 10 | What is the instruction length of ARM processor?   | 2 |

**PART – B (50 Marks)**

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|----|--|----|
| 11 | a) Explain the architecture of 8051 microcontroller.   | 5  |
|    | b) Discuss the applications of Embedded systems.   | 5  |
| 12 | a) Explain the design process of Embedded Systems.   | 5  |
|    | b) Give the details for requirements and specification of a model train controller.                                    | 5  |
| 13 | a) What is the range of JUMP and CALL instructions of 8051? Differentiate between byte jump and bit JUMP with example. | 6  |
|    | b) Write an ALP to count the no. of odd numbers stored in series of data.  | 4  |
| 14 | a) Explain in detail about the rules to be followed by the interrupt routine in RTOS environment.                      | 5  |
|    | b) What are the hard real-time scheduling considerations and briefly explain the methods for saving power?             | 5  |
| 15 | a) Explain how memory management is done in RTOS.  | 5  |
|    | b) What is Re-entrant function? What are the roles of Re-entrant function?   | 5  |
| 16 | a) Explain the memory organization in ARM and SHRC processor.  | 5  |
|    | b) Explain CAN bus protocol in detail and what are its applications?   | 5  |
| 17 | Write short notes on:  | 10 |
|    | a) Cross compiler  |    |
|    | b) 12C Bus   |    |

**FACULTY OF ENGINEERING**

**B.E. 4/4 (CSE) I – Semester (New) (Suppl.) Examination, July 2014**

**Subject: Principles and Applications of Embedded Systems**

**Time: 3 Hours**

**Max.Marks: 75**

**Note: Answer all questions from Part A. Answer any five questions from Part B.**

**PART – A (25 Marks)**

- 1 What is the difference between big-endian and little-endian portability?
- 2 Define co-processor, Unified Cache Memory.
- 3 Distinguish between Micro Processors and Microcontrollers.
- 4 Write the advantages of interrupts over Busy-wait-I/O.
- 5 What is SoC? Give examples.
- 6 List the differences between the task scheduler and dispatcher.
- 7 What are the advantages of Rate monotonic scheduling?
- 8 Define multirate embedded computing system. Give examples.
- 9 What is cross-compiler and cross assembler?
- 10 What is locator map? What are the uses of it?

**PART – B (50 Marks)**

- 11 a) What are the characteristics of embedded system applications?  
b) Explain the details for requirements and specification of a model train controller.
- 12 a) Explain the memory management unit and address translation mechanisms in advanced processors.  
b) What is DMA? How can the concurrency achieved during DMA?
- 13 Consider task 'A' and 'B' is an interrupt sequence routine (ISR) sharing the variable X, explain the problems related to sharing the data and its solution.
- 14 a) Explain the various categories of multiprocessor architecture with neat figure.  
b) What is the specification of CAN bus. Explain this protocol in detail.
- 15 a) Explain RTOS design principles.  
b) What are the goals of a testing process? Explain the test system process.
- 16 a) Explain memory organization in ARM and SHARC processor.  
b) What hardware and software factors might be considered when choosing a computing platform?
- 17 Answer any **two** of the following:
  - a) Write short notes on multiple interrupts.
  - b) Write short notes on I<sup>2</sup>C bus protocol.
  - c) Explain debugging techniques.