



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

**Third Semester, M. Tech - Computer Engineering (MCEN)**

**Semester End Examination; Dec - 2016/Jan - 2017**

**Embedded Systems and Applications**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

### UNIT - I

- |      |  |    |
|------|--|----|
| 1 a. | List and explain the characteristics of embedded computing applications.                                 | 8  |
|      | b. With an illustrative structure, discuss the applicability of each components of the requirement form. | 12 |
| 2 a. | With the help of a requirement form for the GPS moving map, draw an architecture and describe the same.  | 12 |
|      | b. Discuss the various challenges in embedded computing design.  | 8  |

### UNIT - II

- |      |  |    |
|------|--|----|
| 3 a. | With an illustrative sequence diagram, discuss the bus architecture and the working of DMA controller.         | 10 |
|      | b. Write Front panel design of ALARM clock. Also write the requirement table for ALARM clock.                  | 10 |
| 4 a. | Which are the three program components of embedded software? Discuss them in detail.                           | 10 |
|      | b. Obtain CDFG and ARM assembly code for the given C code,<br>if (a+b>0)<br>x = 5;<br>else<br>x = 7;           | 7  |
|      | c. Obtain the single-assignment form of the given basic block,<br>w = a+b;<br>x = a-c;<br>w = x+d;<br>x = a+c; | 3  |

### UNIT - III

- |      |   |    |
|------|---|----|
| 5 a. | Bring out the differences between thread and a process in RTOS.                             | 8  |
|      | b. List and discuss the different types of multi tasking.                                   | 6  |
|      | c. With a neat diagram, discuss the concept of memory mapped object.                        | 6  |
| 6 a. | List and discuss in detail, the basic functions of a Real time Kernel.                      | 12 |
|      | b. Discuss the various factors to be considered for the selection of scheduling algorithms. | 8  |

**UNIT - IV**

- 7 a. Discuss in detail, the types and functions of various target hardware debugging tools. 10
- b. With the help of the structure and the state transition graph. Discuss the working of I<sup>2</sup>C Bus system. 10
- 8 a. Discuss the working of Ethernet CSMA/CD algorithm in detail. 10
- b. With the help of an illustrative set up, discuss the working of monitor program based firmware debugging. 10

**UNIT - V**

- 9 a. List the various key Processor trends in embedded development. Discuss them in detail. 10
- b. Discuss the structure of the Java Development environment for embedded development. 10
- 10 a. Compare and discuss .NET CF with JAVA environment and list out the features. 10
- b. Write short notes on:
  - i) Open Mobile Alliance (OMA) 10
  - ii) Open Handset Alliance (OHA).

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