**B.N.M. Institute of Technology**

**An Autonomous Institution under VTU**

**Model Question Paper**

**Fourth Semester BE, 2022-23 Scheme**

**Microcontroller and Embedded System – 22ISE142**

**Duration: 3 Hour Max. Marks: 100**

***Note: 1. Answer one full question from each Module 1,2,3,4,5 (5Q x 20M = 100 Marks)***

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| **Module 1** | | | | | |
| **Q. No** | **Questions** | **Marks** | **CO** | **PO** | **Cognitive Level** |
| 1 (a) | Choose the difference between Microprocessor and Microcontroller. | 6 | CO1 | PO1 | Apply |
| 1 (b) | What is Pipelining? With a neat diagram present the working of Pipeline. | 6 | CO1 | PO1 | Apply |
| 1 (c) | Illustrate the four main hardware components of an ARM based embedded device with a neat diagram. | 8 | CO1 | PO1 | Apply |
| **OR** | | | | | |
| 2 (a) | Implement the concept of Condition Flags in detail. | 6 | CO1 | PO1 | Apply |
| 2 (b) | Sketch the ARM Core data flow model and explain them in detail. | 6 | CO1 | PO1 | Apply |
| 2 (c) | Develop the concept of exceptions, interrupts and the vector table. | 8 | CO1 | PO1 | Apply |
| **Module 2** | | | | | |
| 3 (a) | Relate the working of ARM processor with co-processor instructions along with syntax. | 6 | CO2 | PO2, PO3 | Apply |
| 3 (b) | Generalize the different barrel shifter operations with suitable examples. | 6 | CO2 | PO2, PO3 | Apply |
| 3 (c) | Integrate the ARM Single-Register and Multiple-Register load-store addressing modes with example. | 8 | CO2 | PO2, PO3 | Apply |
| **OR** | | | | | |
| 4 (a) | Interpret the various logical instructions supported by ARM? Relate them with examples for each | 6 | CO2 | PO2, PO3 | Apply |
| 4 (b) | Display the working of Profiling and Cycle counting. | 6 | CO2 | PO2, PO3 | Apply |
| 4(c) | Build the forward and backward branch by considering an example. | 8 | CO2 | PO2, PO3 | Apply |
| **Module 3** | | | | | |
| 5 (a) | Identify the purposes of embedded system with examples. | 8 | CO3 | PO3, PO4 | Apply |
| 5 (b) | Construct the working of the Stepper Motor | 8 | CO3 | PO3, PO4 | Apply |
| 5(c) | Produce the factors that need to be considered in the selection of memory for Embedded Systems. | 6 | CO3 | PO3, PO4 | Apply |
| **OR** | | | | | |
| 6 (a) | Present the working of following: (i) I2C Bus (ii)SPI Bus | 8 | CO3 | PO3, PO4 | Apply |
| 6 (b) | What is an Embedded System? Examine the difference of general purpose computing system and Embedded system | 8 | CO3 | PO3, PO4 | Apply |
| 6 (C) | Show the working of matrix keyboard interfacing | 6 | CO3 | PO3, PO4 | Apply |
| **Module 4** | | | | | |
| 7 (a) | Classify the operational and non-operational qualities attributes of embedded systems. | 10 | CO4 | PO3, PO4 | Apply |
| 7 (b) | Examine the working of State Machine Model with Examples | 10 | CO4 | PO3, PO4 | Apply |
| **OR** | | | | | |
| 8 (a) | Practice the approaches of Embedded Firmware Design. | 10 | CO4 | PO3, PO4 | Apply |
| 8 (b) | With the functional block diagram, Present the operation of Washing Machine as Application-Specific Embedded system. | 10 | CO4 | PO3, PO4 | Apply |
| **Module 5** | | | | | |
| 9 (a) | Illustrate the process of choosing an RTOS | 8 | CO5 | PO3, PO4 | Apply |
| 9 (b) | Display the working of target hardware debugging | 6 | CO5 | PO3, PO4 | Apply |
| 9 (c) | Show the working of Emulators | 6 | CO5 | PO3, PO4 | Apply |
| **OR** | | | | | |
| 10 (a) | With the help of neat diagram demonstrate the working of embedded system development environment. | 8 | CO5 | PO3, PO4 | Apply |
| 10 (b) | Show the working of Debuggers | 6 | CO5 | PO3, PO4 | Apply |
| 10 (c) | Utilize the working of Simulators. | 6 | CO5 | PO3, PO4 | Apply |