CBCS SCHEME

USN | | | | | | | | | | |

18CS44

Fourth Semester B.E. Degree Examination, June/July 2025
Microcontroller and Embedded Systems

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Draw the basic layout diagram, explain the current program status register. **(05 Marks)**
b. Explain ARM core data flow model with neat diagram. **(10 Marks)**
c. Explain the different processor modes provided by ARM7. **(05 Marks)**

OR

2 a. Write the ARM design philosophy in detail. **(05 Marks)**
b. Explain pipeline in ARM. Illustrate with an example, the pipeline stage of ARM9 and ARM10. **(10 Marks)**
c. Explain embedded system hardware with neat block diagram. **(05 Marks)**

Module-2

3 a. Write the following ARM instructions with an example:
i) MOV ii) MVN iii) ADC iv) ADD v) BIC **(10 Marks)**
b. Discuss Barrel shifter instructions in ARM with suitable examples. **(10 Marks)**

OR

4 a. Write ARM assembly language program to add two 32 bit numbers. **(10 Marks)**
b. Explain profiling and cycle counting in detail. **(10 Marks)**

Module-3

5 a. What is an Embedded system? Explain the different classifications of embedded systems. Give example for each. **(08 Marks)**
b. Write short notes on:
i) Real Time Clock
ii) Watch Dog Timer. **(06 Marks)**
c. Differentiate Embedded systems and general purpose computing systems. **(06 Marks)**

OR

6 a. Describe the different step modes for stepper motor. **(08 Marks)**
b. Write the concept of 7-segment LED display. **(06 Marks)**
c. Differentiate sensors and actuators. **(06 Marks)**

Module-4

7 a. What is hardware software co-design? Explain the fundamental issues in hardware software co-design. **(10 Marks)**
b. Explain the operation of washing machine as application specific embedded system with functional block diagram. **(10 Marks)**

OR

8 a. List the different embedded firmware design approaches in detail. **(10 Marks)**

b. Explain the design of an automatic tea/coffee vending machine with FSM model. **(10 Marks)**

Module-5

9 a. Define the term task process and threads. Explain the process structure, process states and state transitions. **(10 Marks)**

b. List and explain five basic functions of kernel of real time operating systems. **(10 Marks)**

OR

10 a. Explain the concept of deadlock with neat diagram. Mention the different conditions which favour a deadlock situation. **(10 Marks)**

b. Explain the role of Integrated Development Environment (IDE) for embedded software development. **(10 Marks)**

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