CBCS SCHEME

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021
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. Differentiate between RISC and CISC processors. **(06 Marks)**
   b. Explain ARM core data flow model, with neat diagram. **(08 Marks)**
   c. Explain ARM registers used under various modes. **(06 Marks)**

OR

2 a. Explain the architecture of a typical embedded device based in ARM core, with a neat diagram. **(08 Marks)**
   b. Explain the various fields in the current program status register. **(06 Marks)**
   c. Discuss the following with diagram :
      i) Von Neuman architecture with cache.
      ii) Harvard architecture with TCM. **(06 Marks)**

Module-2

3 a. Explain the Barrel Shifter Operation in ARM processor, with neat diagram. **(06 Marks)**
   b. Discuss the load store instruction with respect to :
      i) Single Register Transfer   ii) Multiple Register Transfer. **(08 Marks)**
   c. Write the short notes on :
      i) Register Allocation   ii) Allocation variables to register numbers. **(06 Marks)**

OR

4 a. Write an ALP using ARM instruction to find the factorial of a given number. **(06 Marks)**
   b. Explain Instruction scheduling with respect to ARM Processor. **(10 Marks)**
   c. Show the post condition when MOVs instruction shifts register r1 left by one bit and result is stored in r0. Where r0 = 0 × 00000000 , r1 = 0 × 80000004 and CPSR = nzcvqiFt. **(04 Marks)**

Module-3

5 a. Differentiate between :
      i) Microprocessor and Microcontroller.
      ii) Little Endian and Big Endian architecture. **(08 Marks)**
   b. With neat block diagram, explain the elements of embedded system. **(06 Marks)**
   c. Mention the application of embedded system with example of each. **(06 Marks)**

OR

6 a. Explain the different On board communication interfaces in brief. **(08 Marks)**
   b. Write a note on :
      i) Reset circuit   ii) Watch dog timer. **(06 Marks)**
   c. Explain how program memory are classified. **(06 Marks)**

Module-4

7 a. Explain the Operational and non operational attributes of an embedded systems. **(10 Marks)**

b. Explain the different 'Embedded firmware design' approach in detail. **(10 Marks)**

OR

8 a. With a neat block diagram, explain design and working of Washing Machine. **(10 Marks)**

b. With FSM model, explain the design and operation of automatic tea/coffee vending machine. **(06 Marks)**

c. Explain Super loop based approach of embedded firmware design. **(04 Marks)**

Module-5

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

b. Write a note on Message passing. **(10 Marks)**

OR

10 a. Explain Multiprocessing , Multitasking and Multi programming. **(10 Marks)**

b. Define Process. Explain in detail the structure , Memory organization and State transitions of the process. **(10 Marks)**

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