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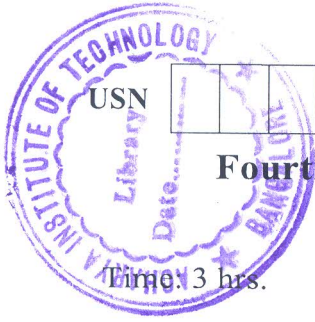
18CS44

Fourth Semester B.E. Degree Examination, July/August 2021
Microcontroller and Embedded Systems

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. Differentiate between Microprocessor and Microcontroller. (06 Marks)
   b. Explain ARM data flow model, with neat diagram. (08 Marks)
   c. With neat diagram, explain Current Program Status Register. (06 Marks)

2 a. Explain with neat diagram, complete register set of ARM 7. (08 Marks)
   b. With neat diagram, explain the Three stage pipeline of ARM 7. (06 Marks)
   c. What is Conditional Execution? Explain with diagram Conditional flags. (06 Marks)

3 a. Explain Barrel Shifter Operation, with neat diagram. (06 Marks)
   b. Write an ALP using instruction to find out the factorial of a given number. (07 Marks)
   c. Write a program to add an array of 16 bit numbers and store the 32 bit result in internal RAM using ARM instructions. (07 Marks)

4 a. Discuss the Load store instructions with respect to single register transfer along with various addressing modes. (10 Marks)
   b. Write a ALP program to multiply two 16 bit numbers. (05 Marks)
   c. With example, explain the Swap Instructions. (05 Marks)

5 a. Differentiate between : i) RISC and CISC architecture.
       ii) Little Endian and Big Endian architecture. (08 Marks)
   b. Explain the various purpose of Embedded systems. (06 Marks)
   c. With circuit diagram, explain the working principle of SRAM. (06 Marks)

6 a. With neat diagram, explain the working principle of Stepper Motor. (08 Marks)
   b. With neat diagram, explain the working principle of 4 * 4 matrix keypad. (06 Marks)
   c. Write a note on : i) USB   ii) Bluetooth (BT). (06 Marks)

7 a. Explain the Operational and Non operational attributes of an Embedded Systems. (10 Marks)
   b. With diagram, explain Washing Machine as Application Specific Embedded System. (10 Marks)

8 a. Explain i) Data Flow Graph (DFG) model   ii) Control Data Flow Graph (DFG) model. (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)

9 a. Define Process. Explain in detail the Structure Memory Organisation and State transitions of the process. (10 Marks)
   b. Explain Multithreading , Multiprocessing and Multitasking. (10 Marks)

10 a. Explain with neat diagram, the concept of 'Dead lock' and mention the different conditions which favour a dead lock situation. (10 Marks)
    b. With neat diagram, explain i) Binary Semaphore   ii) Counting Semaphore. (10 Marks)

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