Hall Ticket Number:

Code No.: 5131 M

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
M.E. (CBCS : ECE) I-Semester Make up Examinations, March-2017
(Communication Engineering & Signal Processing)
Microcontrollers and DSP Processors - Architecture

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Compare microcontrollers and microprocessors.
2. Mention different addressing modes of 8051 microcontroller.
3. Write the pin description of LCD.
4. From the key board interfacing to 8051 identify the row and column of the pressed key for each of the following   a) D3-D0 = 1110 for the row, D3-D0 = 1011 for the column
   b) D3-D0 = 1101 for the row, D3-D0 = 0111 for the column
5. Explain multiply and accumulate unit with block diagram for Digital Signal Processors.
6. Briefly describe the indirect addressing modes of Digital Signal Processors.
7. Explain the MAS instruction with an example.
8. Describe the operation of the following MAC instruction: MAC *AR5+, #1234h, A
9. Explain the pipelining operation for speeding up the execution of an instruction for DSP.
10. Mention the importance of interrupt service routine.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Describe C51 programming model with a block diagram.
    b) Design a C51 counter to read pulses from a rectangular waveform and display the count on port B. Assume data required.

12. a) Write an 8051 C program to send letters 'M', 'D' and 'E' to the LCD display using delays.
    b) Interface a C51 to DAC and generate a stair step ramp.

13. a) Explain with block diagram address generation unit of DSPs.
    b) What is the range of numbers that can be represented in a fixed point format using 16 bits if the numbers are treated as signed integers?

14. a) Explain functional diagram of barrel shifter of TMS320C54XX.
    b) A barrel shifter is to be designed with 16 inputs for left shifts from 0 to 15 bits. How many control lines are required to implement the shifter?

15. a) Draw and explain functional diagram of CPU of the TMS320C54xx.
    b) Describe important features of Commercial DSPs.

16. a) Write the steps for programming 8051 timers in mode 2.
    b) Explain normal 4-step sequence, wave drive 4-step sequence and half-step 8-step sequence of stepper motors.

17. Answer any *two* of the following:
    a) Interrupts of TMS320C54XX processor
    b) Q-notation of DSPs
    c) FIR filters using DSPs.

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