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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; Dec - 2017 / Jan - 2018

Digital Signal Processor and Applications

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Explain the different data addressing capabilities of DSP processor. 10
- b. List the differences between linear and circular buffer. Explain circular addressing mode. 10
- 2 a. With the help of a neat block diagram, explain address generation unit. 6
- b. Explain the pipelined architecture of DSP system. 6
- c. Given,

$$y(n) = \sum_{i=0}^7 h(i)x(n-i), \quad 8$$

Implement the above equation. Using,

- i) Two MAC units ii) Pipelined Implementation using Eight MAC units.

UNIT - II

- 3 a. Explain Direct addressing mode of TMS320C54XX processor. 4
- b. With necessary examples, explain the following instructions :
- i) MPY 10, B ii) MAS *AR3-, *AR4+, B, A 8
- iii) RPTB P_{mad} iv) BANZ P_{mad}, *AR2-. 8
- c. With a neat block diagram, explain the Host port interface circuit. 8
- 4 a. With the help of a neat block diagram, explain multiplier/adder unit of TMS320C54XX processors. 8
- b. Explain the classification of Instructions in TMS320C54XX processor. 8
- c. Explain clock generator and serial I/O port of 54XX devices. 4

UNIT - III

- 5 a. Develop an assembly language program that implements the following equation :
- $$y(n) = h(0)x(n) + h(1)x(n-1) + h(2)x(n-2). \text{ Using,} \quad 12$$
- i) Direct addressing mode
- ii) Using Indirect addressing mode.
- b. Develop an assembly language program for TMS320C54XX processor to multiply two Q-15 numbers to produce the result in Q-15 notation. 8

- 6 a. Develop an assembly language program that multiplies matrix $A = 3 \times 4$ and matrix $B = 4 \times 3$. 8
- b. Explain over flow and scaling in butterfly computation. 8
- c. Explain the need for signal spectrum computation. 4

UNIT - IV

- 7 a. With the help of neat a block diagram, explain how memory can be interfaced to TMS320C5416 processor. 6
- b. Explain the Interfacing of Analog to Digital converter to TMS32054XX devices using programmed I/O. Give the flow chart for the same. 8
- c. Explain how interrupt can be handled by TMS320C54XX processor? 6
- 8 a. Explain register sub-addressing used in configuring DMA controllers for TMS320C54XX devices. 8
- b. With the help of a neat block diagrams, explain Multi Channel Buffered Serial Port (MCBSP) of 54XX processor. 8
- c. Explain PCM 3002 CODEC used in TM 3320C54XX processors. 4

UNIT - V

- 9 a. Explain the architectural features of TMS320C6713 (Floating point) Digital signal processor. 6
- b. Sketch and explain DSP based biotelemetry receiver. 8
- c. Explain how ECG signal can be processed for the determination of Heart rate? 6
- 10 a. With neat diagrams, explain Speech Processing System. 8
- b. Explain Auto Correction Computation. 8
- c. With the help of a neat block diagrams, explain JPEG encoder and decoder. 4

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