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10TE74

Seventh Semester B.E. Degree Examination, Aug./Sept. 2020
DSP Algorithms and Architecture

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. List the major architecture features used in DSP system to achieve high speed program execution. **(08Marks)**

b. Explain the important issues to be unsidered is designing and implementing a DSP system. **(06 Marks)**

c. With an example, what is the need for the low pass filter in decimation process? **(06 Marks)**

2 a. Implement a 4-bit, shift-right barrel shifter, tabulate the outputs for different bit shifts. **(08 Marks)**

b. Discuss the role of saturation logic, elaborate its function with the help of a block diagram. **(08 Marks)**

c. 256 unsigned numbers, 16 bit each are to be summed up in a processor. How many guard bits are needed to prevent overflow? **(04 Marks)**

3 a. List the important failures of a multiplier/ adder unit of TMS320C54XX processor write the functional diagram. **(08 Marks)**

b. With the help a Block diagram, elaborate how ARVs are used to generate addresses for indirect addressing mode of TMS320C54XX processor with a single data memory operand. **(08 Marks)**

c. With an example each discuss immediate addressing mode and absolute addressing mode. **(04 Marks)**

4 a. Compare architectural failures of TMS320C5 DSP5600 and ADSP2100 fixed points DSPS. **(06 Marks)**

b. With neat diagram elaborate the functioning of centric processing unit in a TMS320C54XX processor. **(08 Marks)**

c. Explain the bit configuration of PMST register. **(06 Marks)**

PART – B

5 a. How many add/subtract and multiply operations are needed to implement a general butterfly of DIFFT. **(04 Marks)**

b. What is the need of scaling of inputs? Derive the optimum scaling factor for the DIFFT Butterfly structure. **(08 Marks)**

c. With a net signal flow diagram the FFT algorithm for 8-point DFT. **(08 Marks)**

6 a. With a neat diagram describe memory space organization. **(08 Marks)**

b. With a neat diagram describe memory interface diagram of TMS320C5416 **(07 Marks)**

c. Mention the external bus interfacing signals. **(05 Marks)**

7 a. Draw the I/O interface timing diagram for read, write read sequence of operation. **(08 Marks)**

b. Elaborate the operation of pulse position modulation to encode two biomedical signals. **(08 Marks)**

c. Explain with a neat diagram operation of the pitch detector. **(04 Marks)**

8 a. Explain PCM 3002 CODEC with the help of a neat block diagram. **(08 Marks)**

b. With a help of block diagram, elaborate JPEG encoding and JPEG decoding. **(07 Marks)**

c. What do you understand by a DSP based biotelemetry receiver? **(05 Marks)**

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