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Code No. : 16407 AS O

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (ECE) III Year II-Semester Advanced Supplementary (Old) Examinations, July-2019
Digital Signal Processing

Time: 3 hours

Max. Marks: 70

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

Part-A (10 × 2 = 20 Marks)

1. Define a decimation-in-time FFT algorithm.

2. Find the DFT of the right handed sequence $x(n) = \{1, 0.5, 0.25, 0.125\}$ using decimation-in-frequency algorithm.

3. Write the window function of Kaiser window?

4. Compare Hamming and Blackman windows?

5. What are realization structures for an IIR filters?

6. Distinguish between FIR & IIR filters.

7. When is it necessary for sampling-rate conversion?

8. Mention the noble identities in multirate signal processing.

9. Write the importance of guard bits in the accumulator in digital signal processor?

10. Write the features of TMS320C54XX.

Part-B (5 × 10 = 50 Marks)

11. a) Briefly discuss the computation of 8-point DFT by decimation-in-time algorithm. Use Butterfly configuration for implementation. [6]

   b) Explain the properties of DFT. [4]

12. a) Draw the linear phase realization structures of FIR filter. [5]

   b) Design an FIR digital filter to approximate an ideal low-pass filter with pass band gain of unity, cut-off frequency of 850 Hz and working at a sampling frequency 5KHz. The length of the impulse response should be 5. Use rectangular window $H_d(e^{j\omega}) = 1; 0 \le f \le 850\ Hz$ and zero elsewhere. [5]

13. a) Explain in detail Impulse invariance transformation method for conversion of analog filter to digital filter. [5]

   b) Describe IIR digital filter design techniques. [5]

14. a) Briefly explain the method to down-sample a sequence $x(n)$ by an integer factor of D. [5]

   b) With a neat block diagram, describe the method for sampling rate conversion by a factor I/D. [5]

15. a) Briefly explain the various addressing modes of TMS320C54XX processors? [5]

   b) Compare the characteristic features of ASP, RISC and CPU. [5]

16. a) Write Procedure to evaluate the inverse DFT using FFT algorithms [5]

   b) What is bilinear transformation? [5]

17.   Answer any *two* of the following:
    a)   Write short notes on Butterworth filter   [5]
    b)   Write the applications of Multirate Signal processing.   [5]
    c)   Compare the architectures of a digital signal processor and a microprocessor.   [5]

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