B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Fifth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07EC502: Digital Signal Processing

ee Hours   **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

tal memory requirement of N-point DIT-FFT algorithm is

N/2   b) N – N/2   c) 2N+ N/2   d) 2N – N/2

FT of the sequence $x(n) = \{1,1\}$ using FFT algorithm is

1}   b) $\{1, 0\}$ c) $\{0, 2\}$ d) $\{2, 0\}$

ch of the following filter yields smallest-order filter for a given set of specifications?

tterworth   b) Chebyshev   c) Elliptical   d) Bessels

ch of the following is not a feature of IIR filter?

quire less memory   b) has lower sidelobes in stopband
ear- phase filter   d) phase distortion

e input analog signal is within the range of the quantizer, the resulting error is

anular noise   b) overload noise   c) clipping error   d)offset error

ch of the following about floating point arithmetic is true?

verflow in addition   b) Round-off noise in addition alone
o overflow   d) No round-off errors

hich of the following case, the linear filter is an all-zero filter.

utoregressive process   b) Moving average process
utocorrelation process   d) Autoregressive, moving average process

ch of the following is a parametric method for power spectral estimation?

urg method   b) Welch method   c) Bartlett method   d) Blackman method

C6X pipeline requires a maximum of _____ phases in execute stage.

          b) 4   c) 5   d) 6

10. The serial port that permits the data from a number of I/O devices to be sent using a s serial port is

    a) comm port   b) host port   c) bit I/O port   d) TDM

PART B (10 x 2 = 20 Marks)

11. Determine DTFT of the sequence $x(n) = a^n u(n)$.

12. Draw the basic butterfly diagram of DIF radix-2 FFT algorithm.

13. What is meant by optimum equiripple design criterion?.

14. What are the advantages and disadvantages of bilinear transformation?

15. What is meant by truncation and rounding?

16. Define dead band of the filter?

17. What is power density spectrum of the random process?

18. What is zero padding?

19. List the merits and demerits of RISC and CISC processors?

20. What are the advanced addressing modes supported by digital signal processors?

PART C (5 x 14 = 70 Marks)

21(a) Find the circular convolution of $x_1(n) = \{2, 1, 2, 1\}$ with $x_2(n) = \{1, 2, 3, 4\}$.

(OR)

(b) Derive and draw the radix-2 DIT FFT algorithm of 8 points.

22 (a) Explain the design of linear phase FIR filter using window technique.

(OR)

b) Convert the analog filter with system function

$$Ha(s) = \frac{(s - 0.1)}{(s - 0.1)^2 - 16}$$

into a digital IIR filter by means of the bilinear transformation. Assume the digital filter to have a resonant frequency of $\omega_r = \pi/2$.

i) Give the effect of finite word lengths in FIR digital filters. (7)

ii) Explain the quantization noise model (7)

(OR)

i) Explain signal scaling to prevent overflow limit cycle in digital filter implementation. (8)

ii) Describe the effect of sampling in frequency domain. (6)

Discuss the performance characteristics of non-parametric power spectrum estimators.

(OR)

b) Explain power density spectrum. Discuss the innovations representation of a stationary random process.

a) (i)Explain the difference between Von Neumann and Harvard architecture. Which architecture is preferred for DSP applications and why? (6)

(ii) Draw the architecture of TMS processor and explain its important features. (8)

(OR)

b) Explain the features of TMS320C67X floating point processor.

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