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Question Paper Code : 51453

B.E/B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fifth Semester

Electronics and Communication Engineering

EC 2302/EC 52 – DIGITAL SIGNAL PROCESSING

(Regulations 2008)

(Common to PTEC 2302 Digital Signal Processing for B.E. (Part-Time) Electronics and Communication Engineering Fourth Semester – Regulations 2009)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. State the advantages of FFT over DFTs.

2. What is meant by bit reversal ?

3. Mention the advantages of cascade realization.

4. Convert the given analog transfer function $H(s) = \frac{1}{s+a}$ into digital by impulse invariant method.

5. Give the equations specifying Hamming and Blackman window.

6. Realize the following causal linear phase FIR system function :

$$H(z) = \frac{2}{3} + z^{-1} + \frac{2}{3}z^{-2}$$

7. State the need for scaling in filter implementation.

8. What is product round-off noise ?

9. Give the steps in multistage sampling rate converter design.

10. Write any four applications of multi-rate signal processing.

PART – B (5 × 16 = 80 Marks)

11. (a) With appropriate diagrams describe

(i) overlap-save method **(8)**

(ii) overlap-add method **(8)**

OR

(b) Explain Radix-2 DIF-FFT algorithm. Compare it with DIT-FFT algorithms. **(16)**

12. (a) A desired low pass filter with the following specification is

$0.8 \leq |H(\omega)| \leq 1.0;\ 0 \leq w \leq 0.2\ \pi$

$|H(\omega)| \leq 0.2;\ 0.3\ \pi \leq \omega \leq \pi$

Design Butterworth digital filter using impulse invariant transformation.

OR

(b) (i) Obtain the cascade form realization of the digital system

$$y(n) = \frac{3}{4} y(n-1) - \left(\frac{1}{8}\right) y(n-2) + \frac{1}{3} x(n-1) + x(n).$$ **(8)**

(ii) Convert the given analog filter with a transfer function. **(8)**

$H(s) = \dfrac{2}{(s+1)(s+2)}$ into a digital IIR filter using bilinear transformation.

Assume T = 1 sec.

13. (a) Explain the designing of FIR filters using frequency sampling method. **(16)**

OR

(b) (i) State and explain the properties of FIR filters. State their importance. **(8)**

(ii) Explain linear phase FIR structures. What are the advantages of such structures ? **(8)**