

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

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

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

Design Butterworth digital filter using impulse invariant transformation.

OR

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

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

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

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

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)

14. (a) Discuss the following :
- (i) Product quantization error (8)
 - (ii) Limit cycle oscillations. (8)

OR

- (b) (i) Derive the equation for rounding and truncation errors. (8)
- (ii) Derive the equation for quantization noise power. (8)

15. (a) (i) Explain the implementation steps in speech coding using transform coding. (8)
- (ii) Discuss the design steps involved in the implementation of multistage sampling rate converter. (8)

OR

- (b) Explain the efficient implementation of polyphase decimator and interpolator. (16)
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