Reg. No. : | | | | | | | | | | |

Question Paper Code: 46401

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Sixth Semester

Electronics and Communication Engineering

14UEC601 - DIGITAL SIGNAL PROCESSING

(Regulation 2014)

Duration: 1:45 hour Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. What is Zero padding? What is the purpose of it?
2. What is pre-warping?
3. Write the equation of Hamming and Blackman window functions.
4. Define zero input limit cycle oscillations
5. Give the steps in multistage sampling rate converter design.
6. Find the IDFT of Y(k)={1,0,1,0}.
7. Mention any two procedures for digitizing the transfer function of an analog filter.
8. What is the reason that FIR filter is always stable?
9. What are the advantages of floating point point arthimatic?
10. List out the applications of Multirate signal processing.
11. What are the differences and similarities between DIF and DIT algorithms?

12. What is pre-warping?

13. Write the equation of Hamming and Blackman window functions.

14. Define zero input limit cycle oscillations.

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

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. Perform circular convolution of the following sequence. X(n)={-1,1,2,-1,1,2 } and h(n)={2,1,-2}. (10)

17. Design a digital chebyshev filter that satisfying the following frequency response

$0.707 \le |H(e^{j\omega})| \le 1 \qquad for \quad 0 \le \omega \le \frac{\pi}{2}$

$|H(e^{j\omega})| \le 0.2 \qquad for \quad \frac{3\pi}{4} \le \omega \le \pi$

with T=1 sec using impulse Invariant Transformation technique (10)

18. Design a FIR Linear phase, Digital filter approximating the ideal high-pass filter with a frequency response $H_d(e^{j\omega}) = \begin{cases} 1 & for \ \frac{\pi}{4} \le |\omega| \le \pi \\ 0 & |\omega| < \frac{\pi}{4} \end{cases}$

(i) Determine the co-efficient of 11 tap filter based on the window method Hanning.
(ii) Determine and plot the magnitude and phase response of the filter. (10)

19. A non-recursive system H (z) is designed such a way that, two Linear phase systems $H_1(z)$ and $H_2(z)$ are connected in cascade. Which are given as $H_1(z) = \frac{1}{1-a_1 z^{-1}}$ and $H_2(z) = \frac{1}{1-a_2 z^{-1}}$. Find the output round off noise power? Assume a_1 =0.5 and a_2 =0.6. (10)

20. Explain in detail about two basic operations in Multirate Signal Processing. (10)