G 1064 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electrical and Electronics Engineering

DIGITAL SIGNAL PROCESSING (E)

(Old Scheme—Prior to 2010 Admissions—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Derive the necessary and sufficient condition for an LTI system to be BIBO stable.
2. Test the following systems for time variance ?
   (a) $y(n) = nx^2(n)$.
   (b) $y(n) = a^{x(n)}$.
3. Find the DFT of the sequence.
4. How will you perform linear convolution via circular convolution ?
5. State convolution properties of Z-transform.
6. Define Z-transform. What are the two types of Z-transform ?
7. What is linear phase ? What is the condition to be satisfied by the impulse response in order to have a linear phase ?
8. Explain the Kaiser Window function.
9. Give the bilinear transformation.
10. What are the properties of Butterworth filter and Chebyshev filter ?

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question caries 12 *marks.*

11. Di- he classification of discrete time signals with examples.

Or

·ove properties of Fourier transform.

int DIT-FFT for the following sequences

0, 0, 0, 0, 0}.

Or

14. Perform the circular convolution of the following two sequences.

$x_1(n)=\{2 \quad 1 \quad 2 \quad 1\}, x_2(n)=\{1 \quad 2 \quad 3 \quad 4\}$.

15. Find the inverse Z Transform of the function $X(Z)=Z/(Z-1)(Z-2)(Z-3)$. Using partial fraction method for ROC $|Z|>3, 3>|Z|>2$ and $|Z|<1$.

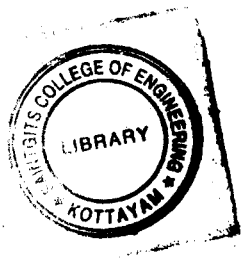
Or

16. Obtain the cascade and parallel form realization for the system

$y(n) = -0.1\, y(n-1) + 0.2\, y(n-2) + 3\, x(n) + 3.6\, x(n-1) + 0.6\, x(n-2)$.

17. Design an ideal differentiator with frequency response $H(e^{j\omega}) = j\omega, -\pi \le \omega \le \pi$ using rectangular window with N = 8. Plot frequency response.

Or



18. Design an ideal high pass filter with a frequency response

$H_d(e^{j\omega}) = 1, \quad \pi/4 \le |\omega| \le \pi$

$= 0. \quad |\omega| < \pi/4.$

Find the transfer function H(z) using Hamming window. Plot the magnitude response.

19. Design a Chebyshev filter with a maximum pass band attenuation of 2.5 dB ; at $\Omega_p = 20$ rad/sec and the stop band attenuation of 30 dB at $\Omega_s = 50$ rad/sec.

Or

20. Draw and explain the architecture of TMS 320C50 processor.

(5 × 12 = 60 marks)