B.Tech. SEM -VII Electrical 2014 Course (CBCS) : SUMMER - 2019

SUBJECT-ELECTIVE-III DIGITAL SIGNAL PROCESSING

Day: Monday
Date: 13/05/2019 S-2019-2813 Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data wherever necessary.

Q.1 **a)** Give frequency response of first order discrete system. **(05)**

b) Explain the following Discrete time systems: **(05)**

i) Linear and Non linear **ii)** Casual and Non Casual

OR

Q.1 **a)** State and explain sampling theorem **(05)**

b) Discuss the classification of Discrete time system in detail **(05)**

Q.2 State and explain following properties of Fourier transform. **(10)**

i) Linearity
ii) Time shifting
iii) Convolution theorem

OR

Q.2 **a)** Define Z transform and its ROC. What is the condition for existence of Z transform? **(05)**

b) Define Inverse Z transform by using Partial Fraction method **(05)**
$X(Z)= (1+Z^{-1}) / (1+5\ Z^{-1}+6\ Z^{-2})$

Q.3 **a)** Define and explain group delay and phase delay **(05)**

b) What is meant by ideal selective filters? Draw the ideal filter characteristics of all types of filters **(05)**

OR

Q.3 **a)** Write a short note on frequency response of **(05)**

i) single pole system
ii) single zero system

b) Explain four types of GLPS Systems in brief **(05)**

Q.4 **a)** State the circular shift property of DFT **(05)**

b) Find the circular convolution of following sequence by matrix method : **(05)**
$x_1(n)=\{1,2,1,2\}$ and $x_2(n)=\{1,2,3\}$

OR

Q.4 **a)** Explain radix -2 DIF –FFT algorithm for N=8 **(05)**

b) Find the DFT of a sequence $x(n)=\{1,0,2,3\}$ **(05)**

Q.5 **a)** Give the comparison between analog & digital filters **(05)**

b) Explain design steps of IIR Butterworth filter. **(05)**

OR

Q.5 **a)** The analog transfer function $H(s)=3/(S^2+5S+4)$. Determine H(z) using impulse invariant transformation assuming T=1sec. **(05)**

b) Explain design of FIR filter with rectangular window. **(05)**

Q.6 **a)** Explain parallels form & cascade form structure of IIR system. **(05)**

b) Determine the direct from II realization of system function: **(05)**
$y(n)=-0.5(n-1)+0.85y(n-2)-0.4x(n)+0.238x(n-2)$

OR

a) Explain basic structure of FIR filter **(05)**

b) Write a short note on finite register length effect **(05)**

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