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7E7072

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B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec.-2016

Electronics & Communication Engineering

7EI2A Digital Signal Processing

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main : 26
Min. Passing Marks Back: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT – I

Q.1 (a) Explain Energy & Power Signals with help of suitable examples. [8]

(b) Explain Sampling & different types of Sampling Techniques. [8]

OR

Q.1 (a) Explain in detail the concept of continuous time processing of discrete time signals. [8]

(b) Explain the properties & applications of discrete time signals. [8]

UNIT – II

Q.2 (a) For the Transform analysis of LTI System, explain the phenomena of all pass System. [8]

(b) Find the magnitude & phase responses for the system characterized by difference equation - $y(n)=\frac{1}{6}x(n)+\frac{1}{3}x(n-1)+\frac{1}{6}x(n-2)$ [8]

OR

Q.2 (a) Explain Linear System with Linear phase. [8]

(b) Discuss briefly the frequency response of LTI system. [8]

UNIT – III

Q.3 Obtain the structures of cascade & parallel realization of following transfer function - $H(z)=\dfrac{(1-z^{-1})^3}{\left(1-\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{8}z^{-1}\right)}$ [16]

OR

Q.3 (a) Explain filter & their use in DSP. [8]

(b) Compare the structures for IIR & FIR System. [8]

UNIT – IV

Q.4 (a) For design of FIR filters by windowing, explain Hamming & Kaiser. [8]

(b) Convert the analog filter into a digital filter whose system function is- $H(S)=\dfrac{S+0.2}{(S+0.2)^2+9}$ Use the impulse invariant technique. Assume T= 1s. [8]

OR

Q.4 (a) Convert the analog filter with system function $H(S)=\dfrac{S+0.1}{(S+0.1)^2+9}$ into a digital IIR filter using bilinear transformation. The digital filter should have a resonant frequency of $W_r=\dfrac{\pi}{u}$? [8]

(b) Explain briefly the Filter Design Techniques. [8]

UNIT – V

Q.5 (a) Explain how DFT can be used as a linear transformation tool in Digital Signal Processing. [8]

(b) Explain various properties of the DFT in brief. [8]

OR

Q.5 Explain & find N-point DFT of following sequence $h(n)=\begin{cases}1/3 & \text{for } 0\le n\le 2\\ 0 & \text{else where}\end{cases}$ [16]
