Total No. of Questions :6]

SEAT No. :

P106

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APR. -16/TE/Insem. - 43

T.E. (Computer Engineering)

DIGITAL SIGNAL PROCESSING APPLICATIONS

(2012 Pattern) (310253) (Semester - II)

Time : 1Hour] *[Max. Marks :30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Neat diagram must be drawn whernever necessary.***
3) ***Assume suitable data if necessary.***

Q1) a) State the mathematical models used to represent a DT system? Define the Impulse response of the system. **[5]**

b) Define two standard signals u(n) and δ(n). Show that

$u(n)=\sum_{k=0}^{\infty}\delta(n-k)$ by means of convolution operation. **[5]**

OR

Q2) a) Discuss the form of an Nth order difference equation used to describe a DT system. How can it be expressed as an FIR and IIR system? **[5]**

b) Discuss the use of Transducers in signal processing and state the sampling theorem. **[5]**

Q3) a) State and discuss Periodicity and symmetry property of DFT. How can we compute N point Circular Convolution using DFT and IDFT? **[5]**

b) Perform following circular shifting operations on a given DT signal x(n) = {1,2,3,4} with N = 5 and N = 6 **[5]**

i) $x((n-3))_N$ ii) $x((n+2))_N$

OR

Q4) a) How N point DFT can be obtained from FT? What is the significance of N in DFT? Why it is necessary to have N > = L where L: length of a DT signal. **[5]**

P.T.O.

b) Draw the basic butterfly structures for DIT and DIF FFT algorithms and hence obtain the computational complexity. **[5]**

Q5) a) Obtain ZT of two standard signals u(n) and $\delta(n)$. Plot its ROCs. **[5]**

b) Define ROC of ZT. Why is it necessary to specify ROC along with ZT? **[5]**

OR

Q6) a) Draw a pole zero plot for a system described as - **[5]**

$y(n) = x(n) - x(n-1) + 3\, y(n-1) - 2\, y(n-2)$.

b) Derive the relationship between ZT and FT. **[5]**