



Total No. of Questions :6]

SEAT No. :

P106

APR. -16/TE/Insem. - 43

[Total No. of Pages :2

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 whenever 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 $\delta(n)$. Show that

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

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 $N \geq L$ 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]

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

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

