Total No. of Questions : 6]

SEAT No. :

P3660

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APR - 15 / Engg. - 145

T.E. (Computer Engineering) (In Sem - Semester - II)

DIGITAL SIGNAL PROCESSING APPLICATIONS

(2012 Pattern)

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

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Why the problem of aliasing is observed during the sampling process? Derive the relationship between analog frequency F and DT frequency f. **[5]**

b) State the advantages of Digital Signal Processing and give the classification of DT signals. **[5]**

OR

Q2) a) Define the impulse response of a system and obtain it for a system described as **[5]**

$$y(n) = x(n) + 0.5\, y(n–l)$$

b) Represent a DT sequence x(n) using convolution. Obtain the computational complexity of linear convolution of two DT signals having N samples each. **[5]**

Q3) a) State and prove : **[5]**

i) time reversal and

ii) time shifting property of a FT.

b) State the necessary condition for the existence of FT. Explain how the magnitude response of a FT is obtained? Obtain DT frequencies $\{\omega k\}$ for 8-point DFT. **[5]**

OR

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Q4) a) Obtain 4 point DFT for a sequence x(n)= {1,-2,2,1} and plot the magnitude spectrum. **[5]**

b) Discuss the periodicity and circular shifting property of N point DFT. How convolution property of DFT is different than FT? **[5]**

Q5) a) Obtain ZT of a DT signal using ZT properties where, **[5]**

$x(n)= 2n.u(n-1)$

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

OR

Q6) a) Obtain ZT of two standard signals u(n) and $\delta(n)$. Plot its ROCs. **[5]**

b) Define a system function H(Z). How it describes the properties of DT system? What is pole zero plot? **[5]**

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