Code: 9A04603

R09

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2014

**DIGITAL SIGNAL PROCESSING**

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Discuss the classification of discrete systems with the help of examples.

2 State and prove the following properties of DFS:
   (a) Linearity.
   (b) Periodic convolution.
   (c) Shift of a sequence.
   (d) Duality.

3 Discuss in detail the concept of decimation in frequency FFT and sketch the necessary flow graph for N=8.

4 Realize the system with following difference equation in direct form-I, direct form-II, cascade and parallel:
   $y(n) = (3/4)\, y(n-1) – (1/8)\, y(n-2) + x(n) + (1/3)x(n-1)$

5 (a) Explain the features of type – I and II Chebyshev filters.
   (b) What are the merits and demerits of bilinear transformation method?

6 Using Bartlett window, design a linear phase FIR filter of order N = 20 to approximate the following ideal frequency response magnitude

$$|H_d(e^{j\omega})| = 1 \qquad |\omega| \le 0.2\pi$$
$$= 0 \qquad 0.2\pi \le |\omega| \le \pi$$

   Also find $H_d(e^{j\omega})$.

7 Discuss the concept of decimation in detail.

8 (a) Explain about digital music synthesis.
   (b) Discuss about spectral analysis of sinusoidal signals.

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