Code: 9A04603

R09

B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2017
DIGITAL SIGNAL PROCESSING
(Common to EIE, E.Con.E, ECC and ECE)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Describe the digital signal processing system.
   (b) Sketch the following signals and its even and odd parts:
         $x(n) = 8(0.5)^n u(n)$

2 (a) The first five points of the eight-point DFT of a real and even sequence are:
         $X(k) = \{5,1,0,2,3\}$.
         Determine the remaining three points.
   (b) State and prove duality property of DFT.

3   Find the 8-point DFT of a sequence $x(n) = (1,2,3,4,4,3,2,1)$ using DIT-FFT radix-2 algorithm. Also sketch magnitude and phase of DFT coefficients.

4 (a) State and prove time shifting property of z-transform.
   (b) Determine z-transform, ROC and pole-zero locations of:
         $x(n) = \alpha^n u(n) + \beta^n u(-n-1)$

5   Discuss the approximation of IIR filter design using derivatives.

6 (a) Discuss about characteristics of linear phase FIR filters.
   (b) What are the effects of windowing?

7 (a) Why sampling rate conversion is required in practical applications.
   (b) Sketch the following signals:
         $x_1(n) = n^2$ $n > 0$
                =0   otherwise
         Also sketch decimated and interpolated version of above signal with factor of '4'.

8 (a) Discuss about musical sound.
   (b) With necessary block diagrams, explain about Discrete Multi Tone transmitter.

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