P4542

[4959] - 1067

B.E. (Electrical)

(Elective - I(d)) DIGITAL SIGNAL PROCESSING

(2012 Pattern) (Semester - I)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :-

1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of calculator is allowed.*
5) *Assume suitable data if necessary.*

Q1) a) State and explain the sampling theorem. **[5]**

b) Explain following properties of Z-transform : **[5]**

   i) Linearity   ii) Time shifting

                                    OR

Q2) a) Find the inverse Z-transform of following function using partial fraction

   $X(z) \dfrac{z}{(z-1)(z-2)(z-3)}$ with ROC $|Z| > 3$ **[5]**

b) Explain following properties of DTFT : **[5]**

   i) Linearity   ii) Time shifting

Q3) a) Determine Fourier transform for the given discrete time signal $x(n) = a^n u(n)$ **[5]**

b) Give the detail classification of discrete time system. **[5]**

                                    OR

Q4) a) Perform linear convolution of $x(n) = \{1,2,3,4\}$ and $h(n) = \{1,1,1,1\}$ **[5]**

b) Determine the Z-transform of the signal $x(n) = a^n u(n) - b^n - (-u - 1)$ with ROC. **[5]**

                                                                                 P.T.O.

Q5) a) Explain Radix-2 DIT FFT algorithm with diagram. **[8]**

b) Explain following properties of DFT. **[8]**

i) Linearity   ii) Time shifting

OR

Q6) a) Determine DFT of following sequence $x(n) = \{1,2,1,2\}$ **[8]**

b) Explain Radix-2 DIF FFT algorithm with diagram **[8]**

Q7) a) Explain ideal selective filters with mathematical expressions. **[8]**

b) Compare Analog Filter with Digital Filters. **[8]**

OR

Q8) a) Explain cascade form structure of IIR filter. **[8]**

b) Explain design of Butterworth IIR filter using Bilinear Transformation. **[8]**

Q9) a) Explain design of FIR filter using rectangular window. **[9]**

b) Compare IIR filter and FIR filter. **[9]**

OR

Q10) a) Explain application of DSP in power measurement. **[9]**

b) What are the different techniques of measurement of frequency using DSP? Explain any one in detail. **[9]**

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