

Total No. of Questions : 10]

SEAT No. :

P4542

[Total No. of Pages : 2

[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

$$X(z) = \frac{z}{(z-1)(z-2)(z-3)} \text{ with ROC } |z| > 3 \quad [5]$$

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]

