

Total No. of Questions :6]

SEAT No. :

P222

[Total No. of Pages :2

Oct./ BE/ Insem. - 538

B.E. (Electrical)

DIGITAL SIGNAL PROCESSING

(2015 Course) (Semester - I) (Elective-I(D))

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of scientific calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

Q1) a) Give the detail classification of discrete time system. [5]

b) State and explain sampling theorem. [5]

OR

Q2) a) Compute linear convolution of following sequences.

i) $x(n) = \{1, 1, \bar{0}, 1, 1\}$ and $h(n) = \{1, -2, -3, \bar{4}\}$ [2]

ii) $x(n) = \frac{1}{3}n$ for $0 \leq n \leq 6$ and $h(n) = 1$ for $-2 \leq n \leq 2$ [4]

b) What is LTI system? [4]

Q3) a) Define Z- transform. Elaborate significance of ROC. [4]

b) Compute Z-transform and ROC of following sequences.

i) $x(n) = \{2, 4, \bar{5}, 7, 0, 1\}$ [2]

ii) $x(n) = (a^n + a^{-n})u(n)$ [4]

OR

P.T.O.

Q4) a) State and prove any two properties of Z-transform. [4]

b) Find inverse Z-transform of following for ROC $|Z| > \frac{1}{2}$. [6]

$$x(z) = \frac{1 - \frac{1}{2}z^{-1}}{1 + \frac{3}{4}z^{-1} + \frac{1}{8}z^{-2}}$$

Q5) a) State and prove any two properties of DTFT. [5]

b) Explain frequency response of first order system. [5]

OR

Q6) a) Define DTFT and inverse DTFT. [4]

b) Obtain DTFT and sketch magnitude spectrum for $x(n) = u(n) - u(n - 4)$. [6]