

9. (a) State and prove following properties of Z Transform: 10

(i) Scaling

(ii) Convolution

(b) Using partial fraction expression method to find the inverse Z Transform of the following transfer function: 10

$$H(Z) = \frac{-4 + 8Z^{-1}}{1 + 6Z^{-1} + 8Z^{-2}}$$

Roll No.

24151

B. Tech. 4th Semester (ECE)

Examination – May, 2017

SIGNALS & SYSTEMS

Paper : EE-228-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*.

All questions carry equal marks.

1. (a) What is continuous time and discrete time signals? 4

(b) Define frequency differentiation property of discrete time Fourier Transform. 2

(c) Give definition of first order and second order continuous time systems. 4

- (d) What is block diagram representation ? 2
- (e) Define differentiation property of Z Transform. 3
- (f) Define final value theorem of Z Transform. 3
- (g) Define region of convergence. 2

SECTION - A

2. Explain unit step, unit ramp and unit impulse function. Also write the relationship between them. 20
3. (a) Explain even and odd signals with the help of examples. 10
- (b) Make a comparison between energy and power signals. 10

SECTION - B

4. (a) Make a difference between continuous time Fourier Transform and discrete time Fourier Transform. 10
- (b) State and prove Parseval's Theorem. 10
5. (a) Find the discrete time Fourier Transform of unit step sequence $x(n) = u(n)$. 6
- (b) What is Fourier Transform ? State and prove different properties of Fourier Transform. 14

SECTION - C

6. Explain first order and second order discrete time systems with mathematical expression. 20
7. Determine the Laplace Transform and the associated region of convergence and pole-zero plot for each of following function of time :

(a) $x(t) = e^{-4t}u(t) + e^{-5t}(\sin 5t).u(t)$ 10

(b) $x(t) = \begin{cases} t, & 0 \leq t \leq 1 \\ 2-t, & 1 \leq t \leq 2 \end{cases}$ 10

SECTION - D

8. (a) Find the Z Transform of discrete time unit step signal. 8
- (b) State and prove following properties of Laplace transform. 12
- (i) Time shifting
- (ii) Linearity
- (iii) Conjugation