

Roll No

EE/EX-224

B.E., III Semester

Examination, December 2016

Choice Based Credit System (CBCS)

Signals and Systems

Time : Three Hours

Maximum Marks : 60

- Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) What are the properties of continuous time LTI systems?
b) Check whether the following systems are LTI system:

i) $\frac{d^3 y(t)}{dt^3} + 2 \frac{d^2 y(t)}{dt^2} + 4 \frac{dy(t)}{dt} + 3y^2(t) = x(t+1)$

ii) $y(n) = a^n u(n)$

2. a) What do you mean by singularity functions? Explain the importance of these functions.
b) Determine whether the following signals are periodic or not:
i) $x(t) = \sin 15 \pi t$
ii) $x(t) = \sin \sqrt{2} \pi t$

3. a) What do you understand by Region of Convergence (ROC). Give an example.
b) What is the difference between Fourier transform and Laplace transform. Define wavelet transform also.

4. a) State and prove Convolution theorem.
b) Find the Fourier transform of the signal :

$x(t) = e^{-b|t|} \cos w_0 t$

5. a) State Dirichlet's conditions. Find out the z-transform for the following discrete time sequences
 $X(n) = Kn^2, n \geq 0$
b) Obtain inverse Z-transform using partial fraction expansion method where $x(z) = \frac{1}{(z-1)(z-3)}$

6. The input $x(t)$ and output $y(t)$ for a system satisfy the differential equation

$\frac{d^3 y(t)}{dt^3} + 3 \frac{dy(t)}{dt} + 2y(t) = x(t)$

- i) Compute the transfer function and impulse response.
ii) Draw the block diagram representation and other representations.
7. a) State and prove any two properties of DTFT and state the significance of impulse response.
b) What do you mean by Sampling? How aliasing effect is minimized?
8. Write short notes on (any two) :
a) Digital filters
b) Energy and Power signals
c) CT systems and DT systems
