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Paper Id: 130303

Subject Code: REC 303
Roll No. | | | | | | | | | | |

B TECH
(SEM-III) THEORY EXAMINATION, 2018-19
SIGNALS AND SYSTEMS

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a) Distinguish between energy and power signal.
b) define power spectral density
c) Explain significance of convolution in a communication system.
d) What are advantages of Laplace transform?
e) What are the limitations of Fourier transform?
f) define a signal
g) What is interpolation in sampling?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a) Classify signals according to signal characteristics.
b) Explain the principle of linearity of DT system.
c) Explain the following properties of Fourier transform: time scaling, conjugate functions.
d) state and prove initial and final value theorem of Laplace transform
e) State and prove sampling theorem

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

a) What is Shannon's sampling theorem? Also discuss aliasing by taking an example.
b) Explain the impulse train sampling of discrete time signals.

4. Attempt any *one* part of the following: 7 x 1 = 7

a) State whether the following signals x (t) is periodic or not, giving reasons. If it is periodic, find the corresponding period.
$X(t) = 2\cos 100\pi t + 5\sin 50t$
b) for an LTI system with unit impulse response $h(t) = e^{-2t}u(t)$ .determine the output to the input $x(t) = e^{-t}u(t)$

5. Attempt any *one* part of the following: 7 x 1 = 7

a) Find the energy spectral density of $f(t) = e^{-at}u(t)$
b) Find impulse response of system described by the equation $2y'(t) + 3y(t) = x(t)$

6. Attempt any *one* part of the following: 7 x 1 = 7

a) State and prove frequency shifting theorem of DTFT.
b) Explain Fourier transform of single sided exponential pulse.

7. Attempt any *one* part of the following: 7 x 1 = 7

a) Find Laplace transform of following signal and Draw ROC $x(t) = \cos(3t + \pi/4)\,u(t)$
b) Determine z transform of : $x(n) = \sin\omega_0 n\, u(n)$