PVP 14

Code: EC3T3

II B.Tech - I Semester – Regular/Supplementary Examinations
November - 2018

SIGNAL AND SYSTEMS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) Evaluate $\int_{-\infty}^{\infty} t^3 \delta(t-2) dt$

b) Determine whether the signal is energy or power and calculate its energy and power. x(t) = $e^{-2t}\, u(t)$

c) State the Parseval's theorem for Continuous time Fourier series.

d) State and prove time shifting property of CTFS.

e) Find the final value of $L^{-1}\left(\frac{3s+4}{S^4+8S^3+10S^2+2S}\right)$.

f) What is the relationship between Fourier transform and Laplace transform?

g) Find the DTFT of x(n) = { 1, -2, 2, 3}.

h) What is the sufficient condition for existence DTFT?

i) Find the Z-transform of e^{3n} u(n).

j) State and prove initial value theorem of Z-transform.

k) What is aliasing?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.
3 x 16 = 48 M

2. a) Examine whether the following signals are periodic or not? If periodic determine the fundamental period. 8 M

i) x(t) = 3 sin 200πt + 4 cos 100t.

ii) x(t) = 2 + cos 2πt. iii) x(n) = $e^{j\pi/2n}$.

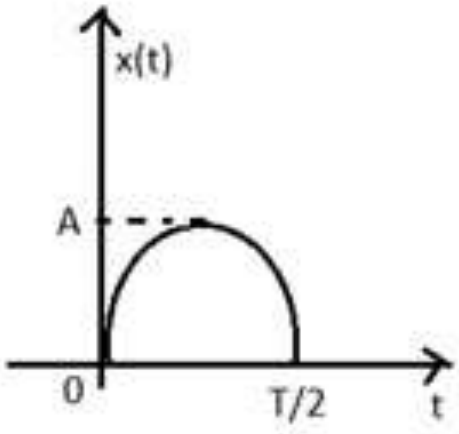
iv) x(n) = cos $\left(\frac{n}{6}\right)$cos $\left(\frac{n\pi}{6}\right)$.

b) Find the linearity, invariance, causality of the following systems: 8 M

i) y(n) = -ax(n – 1) + x(n). ii) y(n) = x(n^2) + x(-n).

3. a) Determine the Fourier series of the signal x(t) = 3 cos ($\frac{\pi}{2}t + \frac{\pi}{3}$). Plot the magnitude and phase spectra. 8 M

b) Find the Fourier transform of the sinusoidal pulse : 8 M



4. a) Find the inverse Laplace transform of 8 M

i) $X(s) = \frac{s+1}{(s+1)^2+4}$. ii) $X(s) = \frac{s-1}{(s+1)(s^2+2s+5)}$.

b) State and prove any four properties of Laplace transform. 8 M

5. a) Determine the discrete time Fourier series of

$x(n) = cos^2\left(\frac{\pi}{6}n\right)$. 8 M

b) Find the DTFT of the signal,

$x(n) = (0.2)^n u(n) + (0.2)^n u(-n-1)$. 8 M

6. a) Using long division method, determine the inverse

Z – transform of $X(z) = \frac{z^2+2z}{z^3-3z^2+4z+1}$ 8 M

b) State and prove the sampling theorem for band – limited signals. 8 M