Code: 15A04303

R15

B.Tech II Year I Semester (R15) Regular & Supplementary Examinations November/December 2017

SIGNALS & SYSTEMS

(Common to ECE and EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define energy and power signals.
(b) Define deterministic and random signals.
(c) State sampling theorem.
(d) State Dirichlets conditions.
(e) Define LTI-CT systems.
(f) What are the transforms used for the analysis of LTI-CT systems?
(g) Define DTFT & Inverse DTFT.
(h) State the Time-Scaling property of LT.
(i) State the relation between DTFT & Z-transform.
(j) List the methods used for finding the Inverse Z-transform.

PART – B

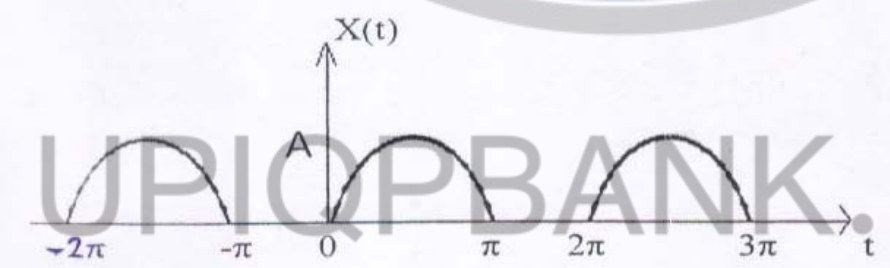
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Explain about the classifications of continuous time signals.

OR

3 Find the Cosine Fourier series of half wave rectified sine function.



UNIT – II

4 State and prove the properties of continuous time Fourier transform.

OR

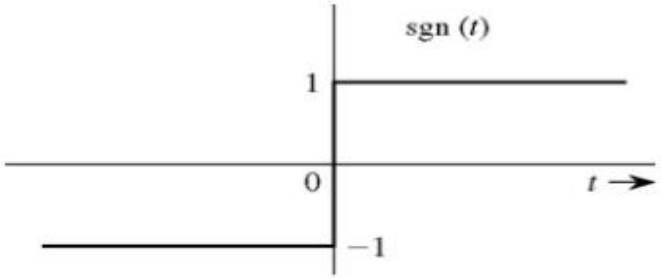
5 State and prove sampling theorem with necessary equations.

UNIT – III

6 Find the Fourier transform of $x(t) = e^{-at} u(t)$. Sketch the magnitude and phase plot.

OR

7 Find the Fourier transform of a signal sgn(t).



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UNIT – IV

8 State and prove any four properties of discrete time Fourier transform.

OR

9 Find the discrete time Fourier transform of: (i) $a^n u(n)$. (ii) $\sin\frac{n\pi}{2} u(n)$

UNIT – V

10 By using Laplace transform, solve the differential equations:

$$\frac{d^3y(t)}{dt^3}+7\frac{d^2y(t)}{dt^2}+16\frac{dy(t)}{dt}+12y(t)=x(t)$$ if x(t) = δ(t) , $\frac{dy(0^-)}{dt}=0,$ $\frac{d^2y(0^-)}{dt^2}=0,$ and $y(0^-)=0$.

OR

11 (a) Describe the Z transform and ROC in detail.

(b) Compute the Z transform of the signal $x(n) = (\sin\omega_0 n)u(n)$.

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