Code: 15A04303 **R15**

B.Tech II Year I Semester (R15) Regular & Supplementary Examinations November/December 2018

SIGNALS & SYSTEMS

(Common to ECE & 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) What are the classifications of signals?
(b) Distinguish between static and dynamic systems.
(c) Draw the graphical form of decaying, raising and double exponential signals.
(d) State Sampling theorem and aliasing.
(e) State polywiener criterion.
(f) What are the characteristics of filter?
(g) Show the relation between Fourier and Laplace transform.
(h) Determine the DTFT of δ(n-2) + δ(n+2).
(i) Define Bilateral and unilateral Laplace transform.
(j) State the final value theorem of Laplace and z-transforms.

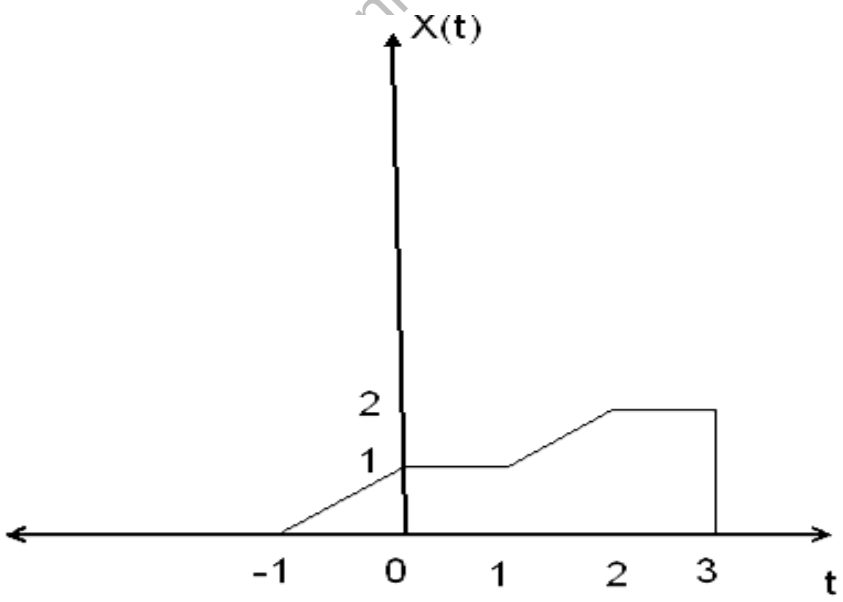
PART – B

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

UNIT – I

2 The continuous time signal x(t) is shown in figure below. Sketch the following waveforms :

- 2x(4t + 2)
- x(t) u(t)
- x(t) [u (t) - u (t - 1)]
- Odd{x(t)}



OR

3 Find the exponential Fourier series for half wave rectified sine wave.

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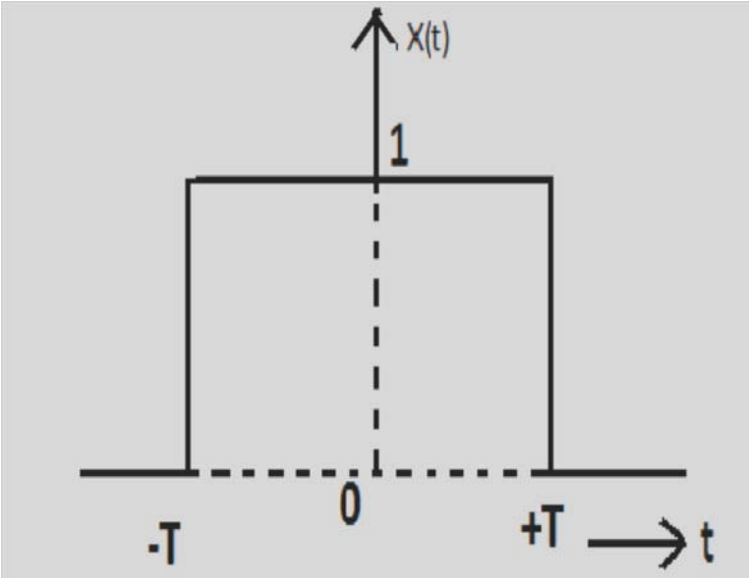
UNIT – II

4 For the rectangular pulse shown in figure below, determine the Fourier transformation of x(t) and sketch the magnitude-phase representation with respect to frequency.



OR

5 State and prove sampling theorem.

UNIT – III

6 Explain the characteristics of ideal filters and why they cannot be realized.

OR

7 Derive the relationship between rise time and bandwidth.

UNIT – IV

8 State and prove the properties of Discrete time Fourier transform.

OR

9 Find the DTFT of the rectangular pulse described by the following equation:

$$x[n]=\begin{cases}1, & |n|\le M\\ 0, & |n|>M\end{cases}$$

UNIT – V

10 (a) Find the Laplace Transform of: (i) $x(t) = e^{-at}\sin\omega t$. (ii) $e^{-2t}u(-t)$.

(b) State and prove convolution and differentiation properties of Laplace transform.

OR

11 (a) Determine Z-Transform, ROC, pole zero locations of:
(i) $x(n) = a^n u(n)$.
(ii) $x(n) = a^n u(-n-1)$.

(b) State and prove any two properties of z- transform.

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