Code: 9A04304

R09

B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013

**SIGNALS & SYSTEMS**

(Common to EIE, E.Con.E, ECE & ECC)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Write short notes on "Orthogonal Functions".

(b) Define the following elementary signals:

(i) Real exponential signal.

(ii) Continuous time version of a sinusoidal signal and bring out the relation between sinusoidal and complex exponential signals.

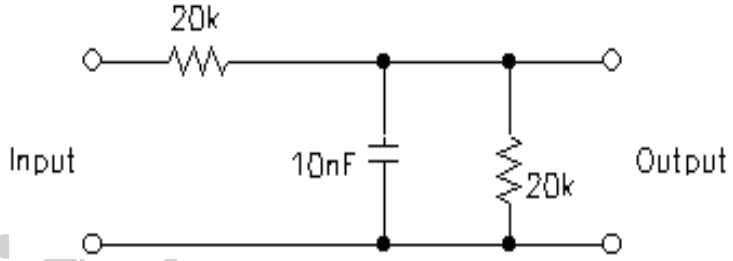
2 (a) Explain the concept of generalized Fourier series representation of signal f(t).

(b) State the properties of Fourier series.

3 (a) Find the Fourier transform of symmetrical triangular pulse and sketch the spectrum.

(b) State and prove symmetry property of Fourier transform.

4 Determine the maximum bandwidth of signals that can be transmitted through the low pass RC filter shown in figure; if over this bandwidth the gain variation is to be within 10 percent and the phase variation is to be within 7 percent of the ideal characteristics.




5 (a) What is sampling? Explain the need for sampling and hence discuss various types of sampling.

(b) Explain clearly the process of sampling for low pass signals and derive conditions for optimum reconstruction of signal.

6 (a) Explain the difference between correlation and convolution with an example.

(b) Find the autocorrelation of a triangular function.

7 (a) Determine the Laplace transform, associated region of convergence and pole-zero plot for the following function: $x(t) = e^{-2t}u(t) + e^{-3t}u(t)$.

(b) State and prove time shifting and shifting in S-domain properties of Laplace transform.

8 (a) Find the inverse transform of $X(z) = \frac{z^2}{(z-a)^2}$, $|z| > |a|$ and $0 < a < 1$ using the residual method.

(b) Use convolution theorem, to find the inverse z transform of $X(z) = \frac{z}{(z-1)^3}$.

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