

Code :RAEE05343

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III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
LINEAR & DISCRETE SYSTEMS ANALYSIS
 (Electrical & Electronics Engineering)

(For students of RR regulation readmitted to III B.Tech II Semester R07)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
 All questions carry equal marks
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1. (a) Define the following:
 - i. State variables
 - ii. State vector.
- (b) State the properties of state transition matrix
- (c) Obtain the state equation of the system for the network as shown in figure 1.

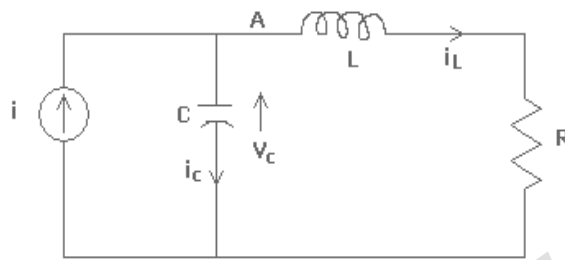


Figure 1:

2. (a) Discuss the effective value of a periodic non-sinusoidal waveform.
- (b) Determine the Fourier series of voltage response obtained at the output of a half wave rectifier shown in figure 2.

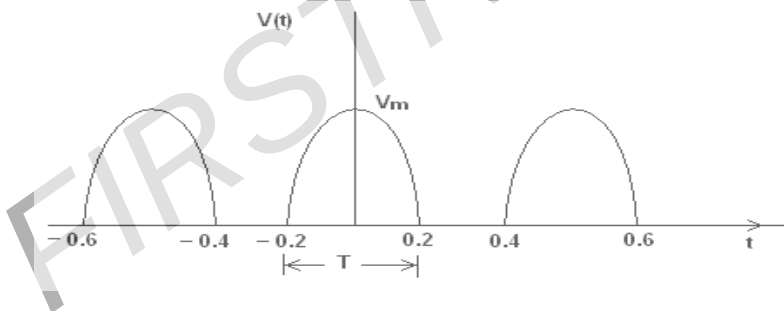


Figure 2:

3. (a) State and prove convolution and differentiation properties of F.T
- (b) Find the F.T of the signum function and plot its amplitude and phase spectrum.
4. (a) Write short notes on "convolution Integral".
- (b) What is ROC for L.T? Explain the properties of ROC.
5. (a) Check if the polynomial $H(s) = 2s^4 + 5s^3 + 6s^2 + 2s + 1$ is Hurwitz or not.
- (b) Check whether the function $N(s) = \frac{2s^2 + 2s + 1}{s^3 + 2s^2 + s + 2}$ is a positive real function.
6. An LC driving point impedance function has infinite impedance at 1000Hz and 4000Hz, and the impedance is zero at 2500Hz. The impedance at 500Hz is $1k\Omega$. Find the driving point impedance function which satisfies the above criteria.
7. (a) Derive the power density spectrum of a periodic signal.
- (b) Find the power of a signal $A + f(t)$, where A is a constant and the signal $f(t) = \sin t$.
8. Using the power series expansion, find the inverse Z-transform of the following $X(z)$:
 - (a) $X(z) = \log\left(\frac{1}{1-a^{-1}z}\right), |z| < |a|$
 - (b) $X(z) = \frac{z}{2z^2 - 3z + 1}, |z| < 1/2$.

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