Printed Pages: 7

NEC - 301

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2289464 Roll No. | | | | | | | | | |

B. TECH

Regular Theory Examination (Odd Sem-III), 2016-17

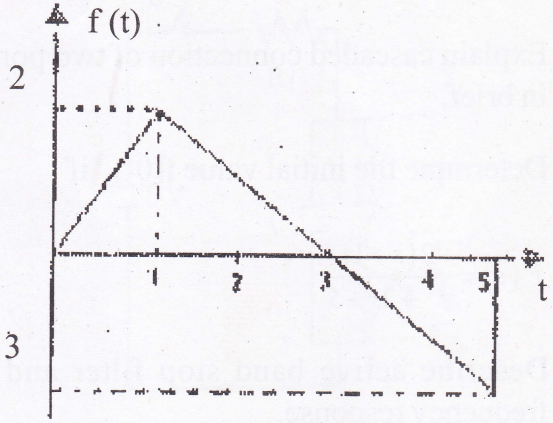
NETWORK ANALYSIS & SYNTHESIS

Time : 3 Hours *Max. Marks : 100*

SECTION - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short questions. (2×10=20)

a) Express the given waveform as shown in figure in terms of ramp function.



b) What Are active and Passive Elements.

c) Write the Hybrid parameters in terms of Z parameters.

d) Write the application of Superposition theorem with its statement.

e) Describe the condition of symmetry in terms of Z and Y parameters.

f) Differentiate network analysis and Network synthesis and also explain zeroes of transmission.

g) Draw Pole-Zero diagram for following impedance function.

$$Z(s)=\frac{(s+1)}{(s^2+2s+2)}$$

h) Explain cascaded connection of two port network in brief.

i) Determine the initial value $f(0^+)$, if

$$F(s)=\frac{2(s+1)}{s^2+2s+5}$$

j) Describe active band stop filter and draw its frequency response.

SECTION - B

Note: Attempt any five questions from this section

(5×10=50)

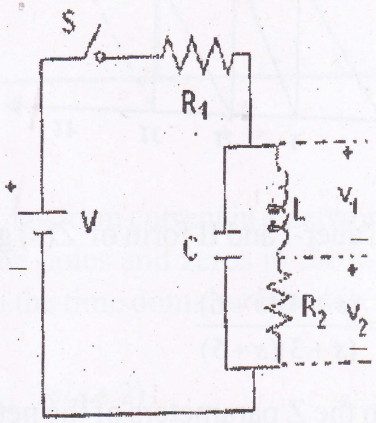
2. a) In the circuit shown in figure given below, the switch S is closed at t=0 with zero capacitor voltage and zero inductor current, solve for

   i) v_1 and v_2 at $t = 0^+$,

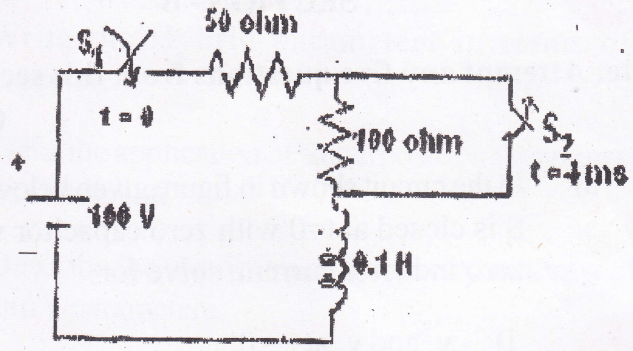
   ii) v_1 and v_2 at $t = \infty$,

   iii) v_1 and v_2 at $t = 0^+$

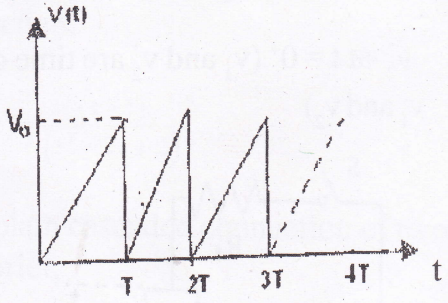
   iv) v_2'' at $t = 0^+$ (v_1 and v_2 are time derivatives of v_1 and v_2)



b) In the circuit shown in figure below. S_1 is closed at $t = 0$ and S_2 is opened at $t = 4$ms. Determine i(t) for $t > 0$.



c) Find the Laplace Transform of the waveform shown in figure below :



d) Find Cauer-I and II form of Z(s) given below.

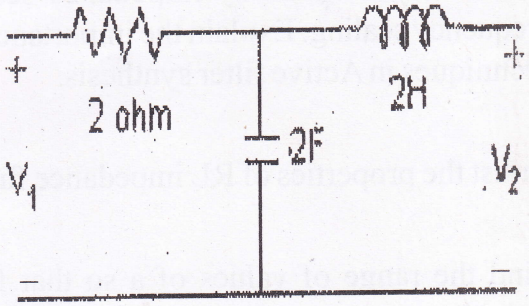
$$Z(s) = \frac{(s+4)(s+6)}{(s+3)(s+5)}$$

e) Obtain the Z parameters of the network in terms of h parameters and T-parameters.

f) Synthesize the given admittance function with a 1 ohm termination

$$Z_{21}^{1}(s) = \frac{(s^2+2)}{s^3+3s^2+3s+2}$$

g) Determine transmission parameters of a T-network shown in figure below, considering three sections as shown in the figure assuming connected in cascaded manner. Also find corresponding Z and Y-parameters.



h) The Transform current in a network is given below. Plot the poles and zeros in the s-plane and hence obtain the time domain response.

$$I(s) = \frac{3s(s+2)}{(s+1)(s+4)}$$

SECTION - C

Note: Attempt any two Questions from this section.

(15×2=30)

3. a) Differentiate Active filters and passive filters. Draw the frequency response of band reject and band pass filter.

   b) What do you mean by impedance scaling and frequency scaling. Explain the importance of these techniques in Active filter synthesis.

4. a) Enlist the properties of RL impedance function.

   b) Find the range of values of a so that following function is a Hurwitz $P(s) = s^4 + s^3 + as^2 + 2s + 3$

5. a) Explain Convolution integral and convolution theorem.

b) Determine the inverse Laplace Transform of the following function using convolution integral :

$$F(s)=\frac{s\left(s^2+4\right)}{s+1}$$