

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE / Electronics & Computer Engg. / ETE) (2011 Onwards)

B.Tech. (Electronics Engg.) (2012 Onwards) (Sem.-3)

NETWORK ANALYSIS AND SYNTHESIS

Subject Code : BTEC-303

Paper ID : [A1127]

Time : 3 Hrs.

Max. Marks : 60

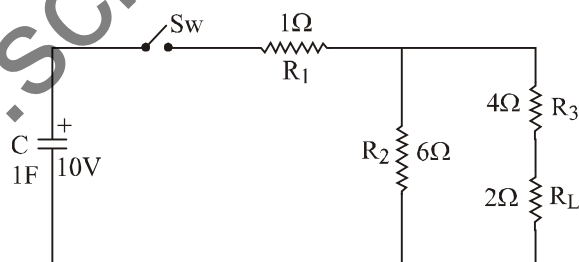
INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

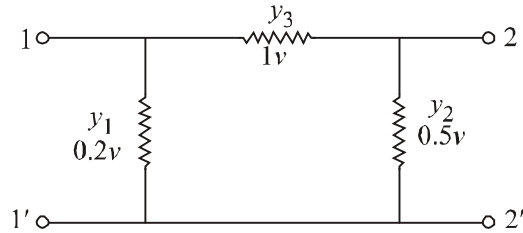
SECTION-A

1) Write briefly :

- a) State Norton's theorem.
- b) Find the voltage at the terminals of a coil having $R = 10\Omega$ and $L = 15H$ at the instant when the current is $10A$ and increasing @ $5A/sec$.
- c) Obtain the Laplace transform of $f(t) = e^{-\theta t} \cos \omega t$, θ being a constant.
- d) Find the expression of discharging voltage of the capacitor at $t = 0+$ following switching at $t = 0$.



- e) State Routh Hurwitz criterion of stability of Network function.
- f) Differentiate between active and passive filters.
- g) Discuss the disadvantages of constant-k filters in detail.
- h) Explain the additive property of superposition theorem.
- i) Give the basic principle of driving point synthesis.
- j) Find the equivalent T network for the given Π network



SECTION-B

- 2) The driving point impedance of a one port LC network is given by

$$Z(s) = (6s^3 + 2s)/(12s^4 + 8s^2 + 1)$$
 For this impedance function, find equivalent first and second Cauer network.
- 3) Design T and Π sections of m-derived high pass filter having nominal characteristic impedance of 600Ω , cut off frequency of 4KHz and infinite attenuation at 3.6 KHz.
- 4) Give the restriction on the locations of poles and zeros in the driving point functions.
- 5) State and Prove Maximum Power Transfer Theorem.
- 6) Apply Routh Criterion to the following equation and determine the number of roots
 - a) with positive real parts
 - b) with zero real parts
 - c) with negative real parts.

$$s^6 + 6s^5 + 8s^4 + 38s^3 + 47s^2 + 52s + 30 = 0$$

SECTION-C

- 7) What is a filter? Give the properties of filter. Classify the filters depending upon the relationship between the arm impedances. Derive the expressions for β , α and characteristic impedance of a low pass filter in the pass band and stop band.
- 8) Discuss the conditions under which a passive two port network is reciprocal and symmetrical. Let the transform current $I(s)$ in a network be given by $I(s) = 9s / \{(s+3)(s+4)\}$. Plot the poles and zeros in the s-plane and hence obtain the time domain response.
- 9) What is the Power loss in the 1Ω resistor (R_L) of circuit given? Use Norton's theorem.

