Examination May –2014
BTEC-303: NETWORK ANALYSIS AND SYNTHESIS
Paper ID : A1127

Time Allowed: 3 Hours.   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 student has to attempt any Four questions.*
3. *Section-C contains Three questions carrying Ten marks each and student has to attempt any two questions.*

Section –A   (10X2= 20 Marks)

Q.1   a)   State Thevenin's theorem.

   b)   Find the energy stored in the inductor of a coil having R=10 and L= 15H at the instant when the current is 10A and increasing@5A/sec.

   c)   Obtain the Laplace transform of $f(t)=1-e^{at}$, a being a constant.

   d)   Show the derivative of an unit ramp function is a step function.

   e)   State the condition for any active network or a general system to be a strictly stable system.

   f)   Check whether the polynomial $S^8+S^7+S^6-2S^5+4S^3+S^2+S+1$ is Hurwitz or not.

   g)   Which property of reactive network is referred to as the separation property.

   h)   Explain the homogeneity property of superposition theorem

   i)   Give relationship between neper and decibel.

   j)   What are terminating half sections?
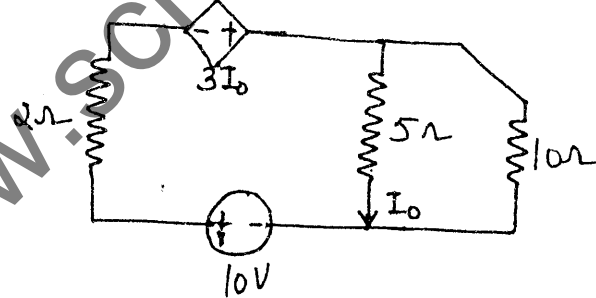
Section –B   (4X5=20 Marks)

Q.2   The driving point impedance of a one port LC network is given by

   $Z(s)=5\{s(s^2+4)\}/\{(s^2+1)(s^2+9)\}$

   Obtain the first and second Foster form of equivalent network.

Q.3   What are composite filters? Why are they needed? Give block diagram representation of composite filter. Also derive the value of m at which terminating half sections should be designed.

Q.4 Give the restriction on the locations of poles and zeros in the transfer functions.

Q.5 State and Prove Superposition Theorem.

Q.6 Apply Routh Criterion to the following equation and determine the number of roots (i) with positive real parts (ii) with zero parts (iii) with negative real parts.
$$S^5+S^4+4S^3+24S^2+3S+63=0$$

Section –C

(2X10=20 Marks)

Q.7 What is a filter? Give the properties of filter? Classify the filters depending upon the relationship between the arm impedance. Derive the expressions for β, α and characteristic impedance of a filter in the pass band and stop band.

Q.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)=2s/{(s+1)(s+2)} plot the poles and zeros in the s-plane and hence obtain the time domain response.

Q.9 Find the current through 10Ω resistor in the given circuit using (i) Thevenin's theorem (ii) Norton's theorem.

-------End-------