

Total No. of Printed Pages:03

**SUBJECT CODE NO:- H-1038**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.Y. B.Tech. (Electrical) (Sem-IV)**  
**Network Analysis**  
**Rev.CBC & Grading.**

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

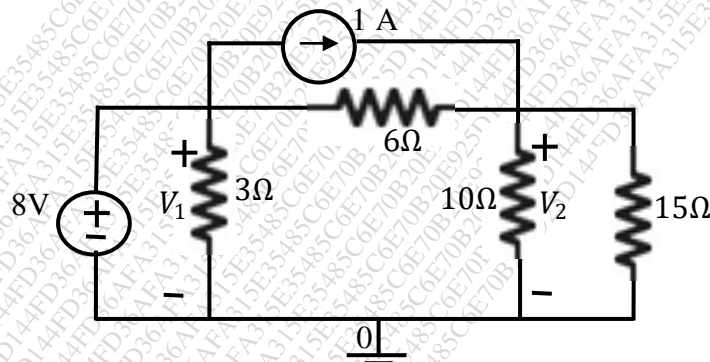
- N.B
1. Question no 1 from section A and question no 6 from section B are compulsory.
  2. Solve any two from remaining questions from each section.
  3. Assume suitable data, if required.

## Section A

Q.1 Attempt any five of the following: 10

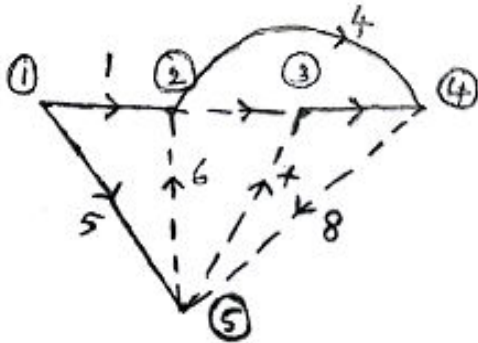
- a) State KCL.
- b) Define active and passive network
- c) What do you mean by resonance?
- d) Define Tree and Co – tree
- e) Define Twig and Links
- f) Write the Laplace transform of Unit Step and Unit Ramp function.
- g) Define time constant in RC Circuit.

Q.2 a) Determine the values of  $V_1$  and  $V_2$  in following circuit by nodal analysis. 07

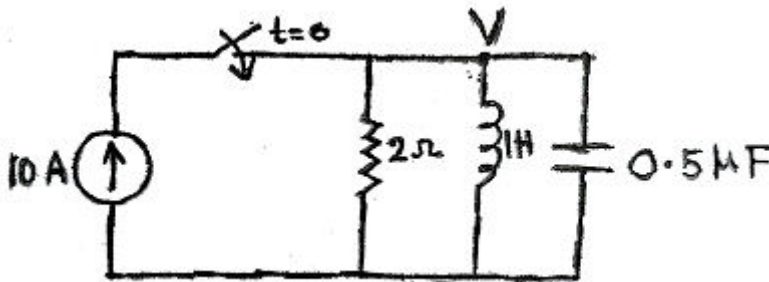


b) Explain the resonance in RLC series circuit and define quality factor. 08

- Q.3 a) Obtain Fundamental Cut – set matrix and fundamental tie – set matrix for following graph. 08

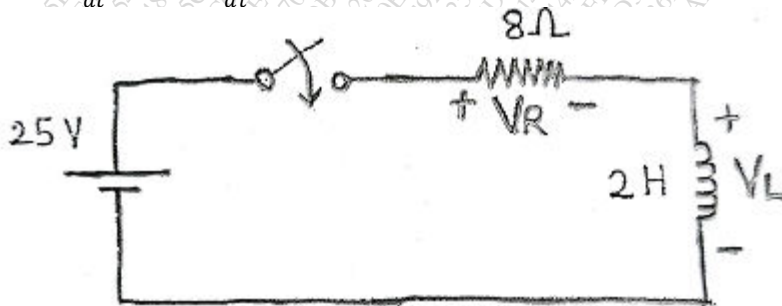


- b) Draw the dual of the following network. 07



- Q.4 a) Derive the expression for transient response of current in RL series circuit if switch is closed 08  
at  $t = 0$ . Assume zero initial conditions. Use Laplace transform.

- b) In following circuit switch is closed at  $t = 0$  with zero initial conditions. Determine 07  
 $i(t)$ ,  $\frac{di(t)}{dt}$  and  $\frac{d^2i(t)}{dt^2}$  at  $t = 0+$ .



- Q.5 Write a short note: ( any three) 15

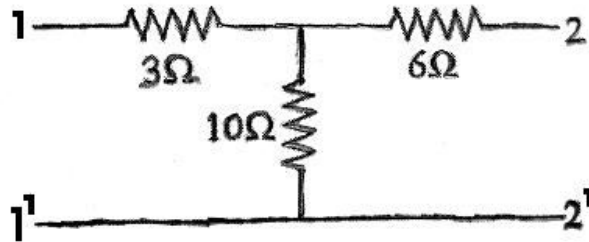
- Telgellen's Theorem
- Filter used for Band rejects
- Initial conditions for R, L & C.
- Fundamental Cut – set and fundamental Cut – set Matrix.

## Section B

Q.6 Solve any FIVE from following.

10

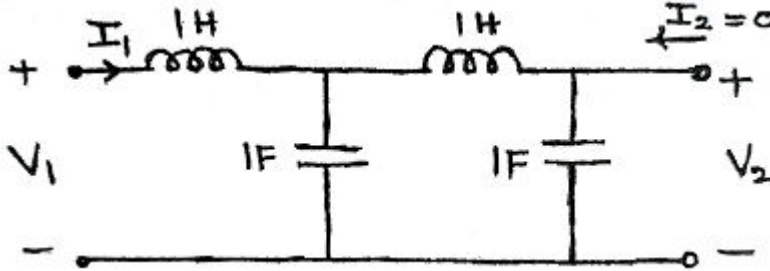
- Why Z – parameters are called as open circuit impedance (Z) parameter
- Define driving point impedance at port 1 with port 2 open
- Give any 2 condition for a function to be positive real.
- Define Hurwitz polynomial.
- What does a pole at infinity indicate?
- Test whether the polynomial  $P(S) = S^3 + 4S^2 + 5S + 2$  is Hurwitz.
- Write the Z – parameters of the following network



Q.7

- a) Find the transmission parameter for the network shown.

07



- Derive the inter – relationship between
  - Z and Y parameters
  - Z and ABCD parameters

08

Q.8

- a) Test whether the following function is positive real.
- $Z(s) = \frac{s^2 + 2s + 15}{s + 5}$
- .

07

- b) Explain the conditions for reciprocity and symmetry of the circuit in terms of parameters.

08

Q.9

- a) Realize the foster form of following RC circuit impedance function
- $z(s) = \frac{(s+2)(s+4)}{(s+1)(s+3)}$
- .

08

- b) Find the Cauer form of the following RL circuit impedance function
- $z(s) = \frac{2(s+1)(s+4)}{(s+2)(s+3)}$
- .

07



Q.10 Write short Note on (any three)

- h) Significance of poles and Zeros.
- i) Transformed impedance
- j) Hurwitz polynomials
- k) Canonical (standard) forms of L –C NETWORK?