GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III (Old) EXAMINATION – WINTER 2019

Subject Code: 130901   **Date: 28/11/2019**

Subject Name: Circuits And Networks

**Time: 02:30 PM TO 05:00 PM**   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** State and explain Thevenin's and Norton's theorem with suitable examples. **07**
(b) What are Y parameters and Z parameters? Derive the expression for Z parameters in terms of Y parameters and vice versa. **07**

Q.2 **(a)** Define following terms: (i) Linear and Nonlinear networks (ii) Lumped and Distributed Networks (iii) Passive and Active Networks (iv) Dependent Source **07**
(b) State and explain initial value and final value theorem. **07**
OR
(b) Obtain the laplce transform for $f_1(t)=t$ and $f_2(t)= te^{-at}$ **07**

Q.3 **(a)** State and explain principle of duality. **07**
(b) Solve for the nodal voltages V1, V2, V3 and V4 as shown in the network in figure , using nodal analysis. **07**
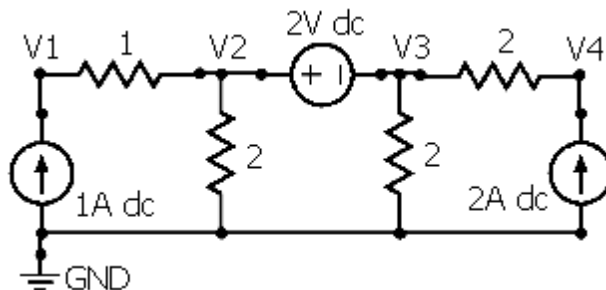

OR
Q.3 **(a)** State the procedure to obtain solution of a network using laplace transform technique. State its advantages over classical method. **07**
(b) In the network shown in fig. the switch K is opened at t=0. find the valus of V, dV/dt, d^2V/dt^2 at $t=0^+$ if I=10 A, R=10 Ω and L=1 H **07**
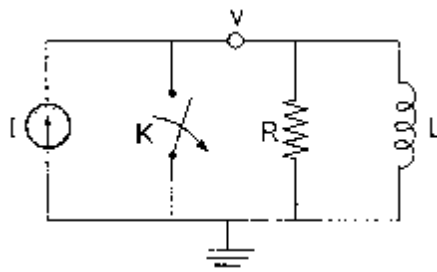
Q.4 **(a)** State and explain maximum power transfer theorem. derive the condition for maximum power transfer to the load for d.c. circuits. **07**
(b) In the network shown in fig. the switch K is moved from 1 to 2 position at t=0, steady state having previously been attained. Determine the current i(t) **07**
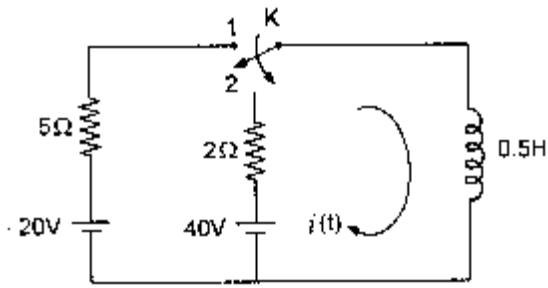
OR

Q.4 **(a)** What is meant by poles and zeros of a transfer function? what is significance of poles and zeros? Discuss the restrictions on locations of poles and zeros of transfer functions. **07**

(b) Derive expression for rise of current and decay of current in RL series circuit excited by DC voltage source. Discuss the role of time constant in each. **07**
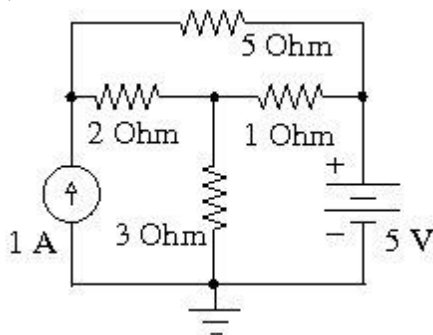
Q.5 **(a)** What are the procedure for formulation of graph, tree and incidence matrix? Hence discuss the procedure of forming reduced incidence matrix and its advantages. **07**

(b) For the network shown in fig. draw the oriented graph. Also obtain incidence matrix (A), fundamental tie-set matrix (Bf) and fundamental cut-set matrix (Qf) **07**
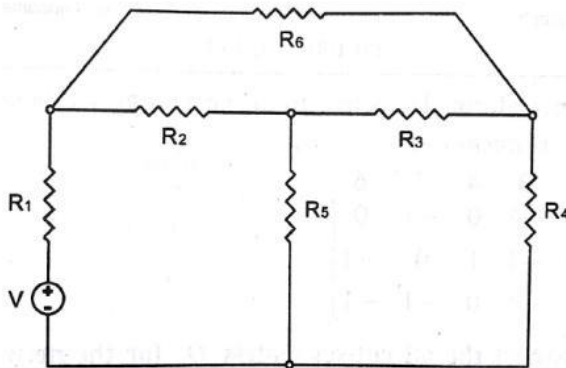
OR

Q.5 **(a)** Write and explain initial conditions for the inductor and capacitor at $t=0_+$ and $t=\infty$ **07**

(b) Find the current passing through the 2 Ohm resistor using Mesh analysis for the circuit shown in the following figure. **07**

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