S.E (Biomedical) (Sem-III) May 2011

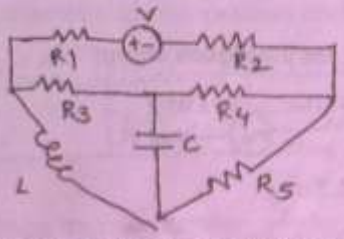
184-mk : 1elH-11. Electrical Network Analysis & Synthesis

Con. 3953-11. 11/6/11 **RK-1282**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume any **suitable** data if **required.**
(4) **Figures** to the **right** indicates **full** marks.

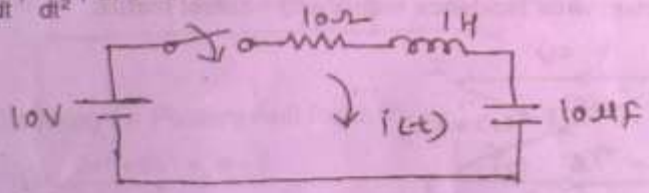
1. (a) Draw the dual of the network. 5



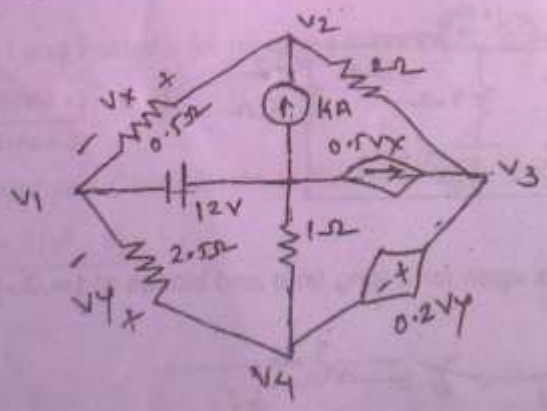
(b) Write a short note on Initial condition and its significance. 5

(c) In the network shown, switch is closed. Assuming all initial conditions as zero, 5

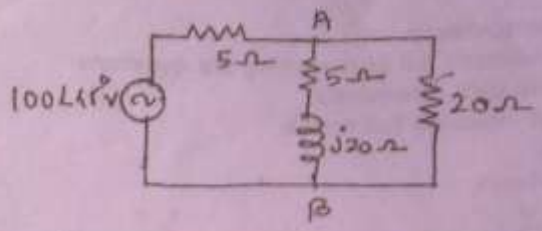
find i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$, at $t = 0^+$.



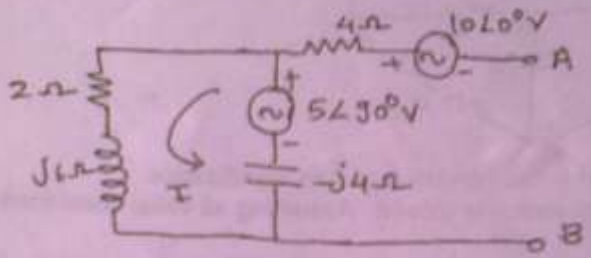
(d) Find nodal voltages in the circuit shown in **figure** :— 5



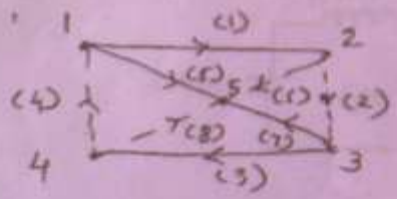
2. (a) For the network shown in **figure** find voltage V_{AB} :— 10



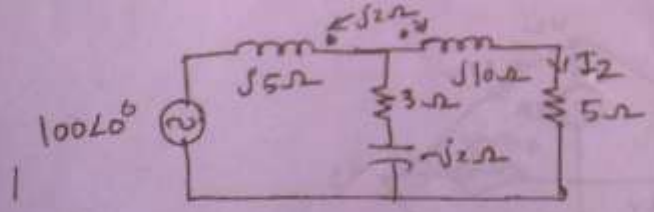
(b) Obtain Thevenin's equivalent network for the **figure** shown :— 10



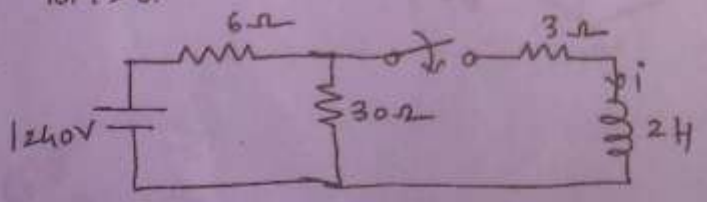
3. (a) For the grain shown, write incidence matrix and f-cutset matrix. 10



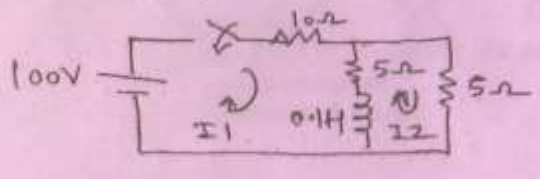
(b) Find I_2 by mesh analysis :— 10



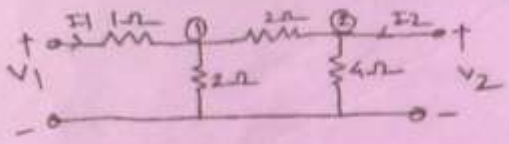
4. (a) The switch in **figure** is open for a long time and closes at t = 0. Determine i(t) for t > 0. 10



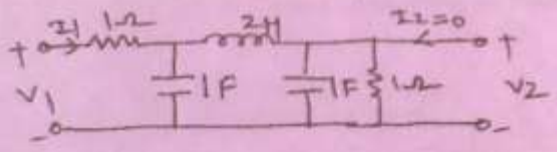
(b) For the circuit shown in **figure**. Find currents $i_1(t)$ and $i_2(t)$ which results when switch is closed at t = 0. 10



5. (a) Determine Y parameter for the network shown — 10



(b) Determine voltage transfer function $\frac{V_2}{V_1}$ for the network. 10



6. (a) Test the following for Positive real function :— 10

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

(b) (i) State and derive maximum power transfer theorem for d.c. circuit. 5
(ii) Explain gain crossover frequency and phase margin. 5

7. (a) Find the Foster I and Foster II forms of the following R_L impedance function :— 10

$$Z(s) = \frac{(s+1)(s+4)}{(s+5)(s+3)}$$

(b) Realise the Foster and Cauer forms of the following impedance function :— 10

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