Code: R5 100406
B.Tech I Year (R05) Supplementary Examinations, May 2012

## NETWORK ANALYSIS

(Common to ECE, EIE, BME and ECC)
Time: 3 hours
Max Marks: 80
Answer any FIVE questions
All questions carry equal marks

1 (a) Define and explain (i) Resistance (ii) Inductance (iii) Graph (iv) Basic cut set matrix.
(b) For a given network draw the graph and choose a possible tree. Construct the basic tie set schedule. Write the equations for the branch currents and in terms of link currents and write separately the independent equations.


2 (a) Define co-efficient of coupling and derive the expression for co-efficient of coupling.
(b) Two coils $A$ and $B$ are connected in series the coils have self inductances $L_{A}$ and $L_{B}$ with a mutual inductance M . What is the effective inductance of the series circuit?

3 For the circuit shown the switch is closed at $\mathrm{t}=0$, find the values of $\dot{i}_{1}, \dot{i}_{2}, \frac{d i_{1}}{d t}, \frac{d i_{2}}{d t}, \frac{d^{2} i 1}{d t^{2}}$ and $\frac{d^{2} i 2}{d t^{2}}$ at $\mathrm{t}=0^{+}$.


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Find the response of the network shown when the input voltage is (i) unit impulse function $\delta(t)$. (ii) $\vartheta_{i}(\mathrm{t})=e^{-2 t}$


5 (a) State and explain maximum power transfer theorem.
(b) Draw the dual network for the given circuit and also write down the procedure to obtain dual network.


6 (a) Define and obtain hybrid parameters by taking any one example.
(b) Obtain short circuit parameters for the given network.


7 What is an alternator? Briefly explain the design of alternator.
8 (a) Write short notes on constant K high pass filters.
(b) Design a low pass filter to have a cutoff at 796 Hz when terminated in a $600 \Omega$ resistance in the $T$ configuration.

