Code: R7100406

R7

B.Tech I Year (R07) Supplementary Examinations, June 2013

NETWORK ANALYSIS
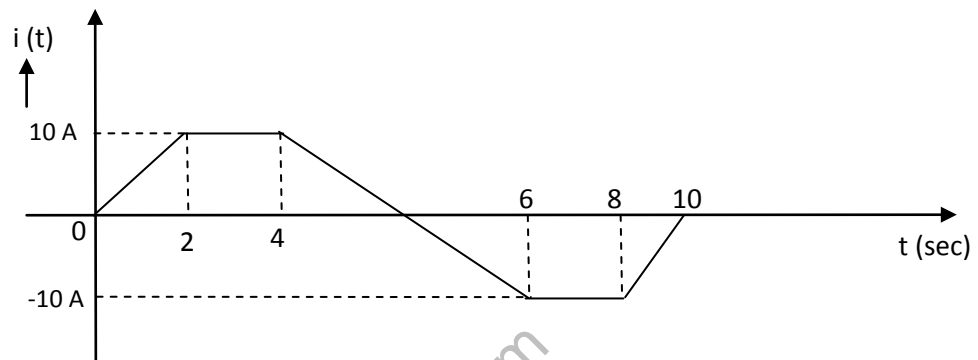### (Common to ECE, EIE, E.Con.E and ECC)

Time: 3 hours   Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1 (a) Explain active elements in detail.
   (b) A pure inductance of 3 mH carries a current of the wave form shown in figure. Sketch the waveform of V (t) and P (t). Determine the average value of power.

2 (a) Define and explain self – inductance and mutual – inductance.
   (b) Two coupled coils of $L_1 = 0.8$ H and $L_2 = 0.2$ H have a coupling coefficient k = 0.9. Find the mutual inductance M. Derive the expression used.

3 (a) Show that the resonant frequency ω_0 of an RLC series circuit is the geometric mean of ω_1 and ω_2, the lower and upper half power frequencies respectively.
   (b) Given a series RLC circuit with R = 10 ohms, L = 1 mH and C = 1 μF is connected across a sinusoidal source of 20 V with variable frequency. Find:
        (i) The resonant frequency. (ii) Q factor of the circuit at resonant frequency. (iii) Half power frequencies.
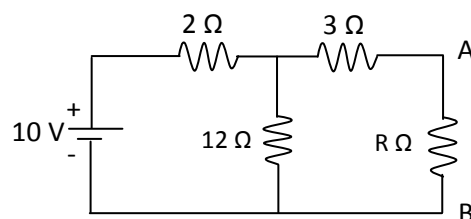
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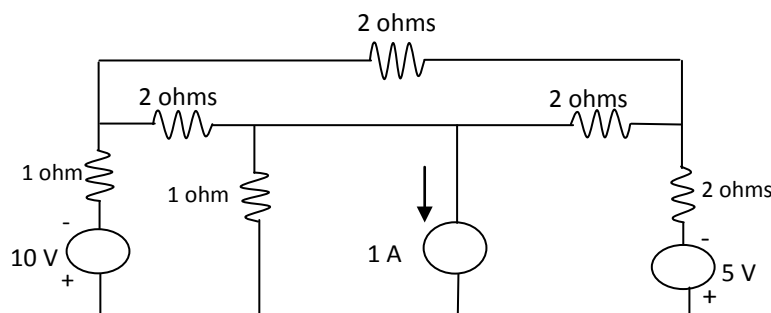
For the above network, draw (i) Graph. (ii) Tree. (iii) Dual network and also write down the procedure to draw dual network.

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5   (a)   State and explain Tellegens theorem.
    (b)   When the load impedance R draws the maximum power? Find the maximum power delivered to the load by using maximum power transfer theorem for the given network.

6   (a)   Derive the relation between Z and ABCD parameters in a two port network.
    (b)   Define and explain h-parameters of a two port network.

7   A 50 Hz, 400 V (peak value) sinusoidal voltage is applied at t = 0 to a series RL circuit having resistance 5 ohms and inductance 0.2 H. Obtain an expression for current at any Instant 't', Calculate the value of transient current 0.01 sec after switching ON.

8   (a)   Write short notes on m-derived low pass filter.
    (b)   Design m-derived low pass filter having a cut of frequency of 1 KHz, resonant frequency of 1200 Hz and design impedance of 500 ohms.

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