Code: 9A02406

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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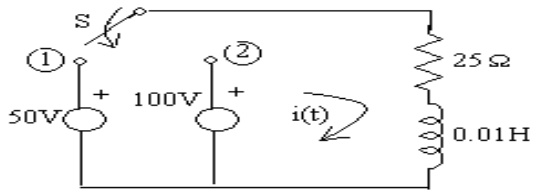
1 (a) Write down the advantages of a poly phase system? What is phase sequence? Explain the significance of phase sequence.

(b) A delta connected 3-phase load has a resistance of 10 Ω and inductive reactance of 15 Ω in each phase. It is fed by 3-phase, 440 V, 50 Hz supply. Find
(i) Apparent power. (ii) Active power. (iii) Reactive power.

2 Show that in the two-wattmeter method of 3-Φ power measurement, the sum of the readings of the two wattmeters gives the total power consumed in 3-Φ circuit. Hence prove: $\Phi = \tan^{-1}(\sqrt{3}(w_1-w_2)/ (w_1+w_2))$.
Where Φ is the phase angle of the load and w_1 & w_2 are the readings of the wattmeters.

3 (a) Derive the expression for current when a dc voltage V is applied suddenly (i.e. at time = 0) by closing a switch in a series R-L circuit.

(b) In the circuit shown in fig below, the switch is in position (1) to establish steady state condition and at t = 0, it is switched to position (2). Find the resulting current.



4 A series RC circuit with R = 100 Ω and C = 25 μF has a sinusoidal voltage V = 250 sin (500 t). Find the total current assuming that the capacitor is initially uncharged.

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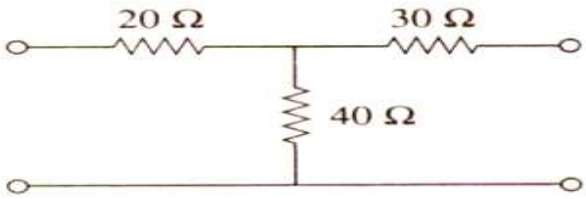
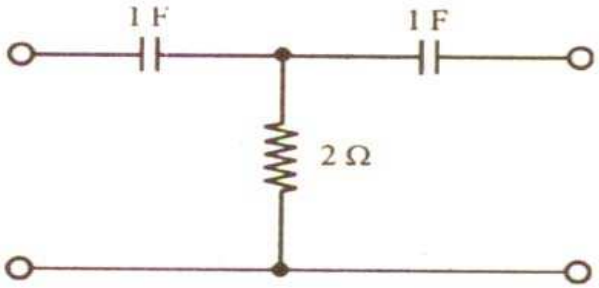
5 Determine z and y parameters of the network shown below:



6 Find the transmission parameters for the network shown below:



7 Sketch the diagram of a rectangular pulse train. Derive its Fourier series.

8 Discuss the time shifting and frequency shifting properties of Fourier transform.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

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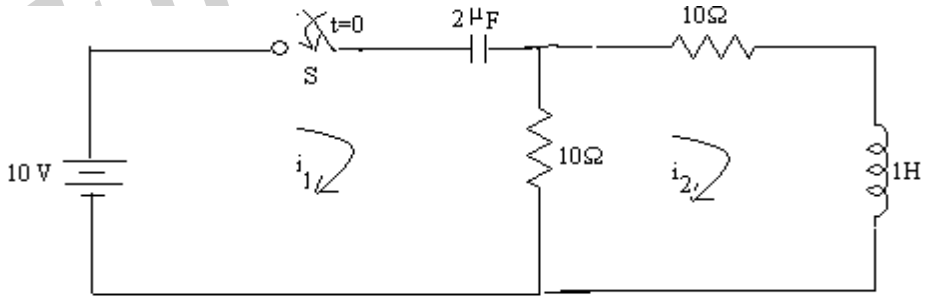
1 (a) Derive the relation between phase voltage and line voltage, phase current and line current of a three phase delta connected balanced system.

(b) Three choke coils each having a resistance of 10 Ω and inductance 0.019 H are connected in star across a 3-phase, 415 V, 50 Hz ac supply.
Find (i) Line current (ii) Power factor and (iii) Power input.

2 Two wattmeters are used to measure the power input in a 3-Φ circuit indicate 1000 W and 500 W respectively. Find the power factor of the circuit:
(i) When both wattmeter readings are positive.
(ii) When the latter is obtained by reversing the current coil connections. Derive the expression for power factor.

3 (a) Derive the expression for current when a dc voltage V is applied suddenly (i.e. at time = 0) by closing a switch in a series R-L circuit.

(b) In the circuit shown in the below fig. the switch is closed at t = 0. Find the values of i_1, i_2, di_1/dt, di_2/dt, d^2i_1/dt^2 and d^2i_2/dt^2 at $t = 0^+$.



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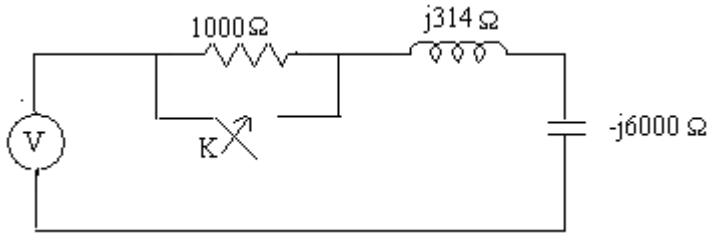
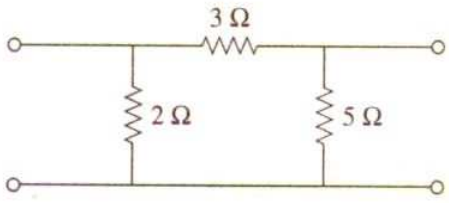
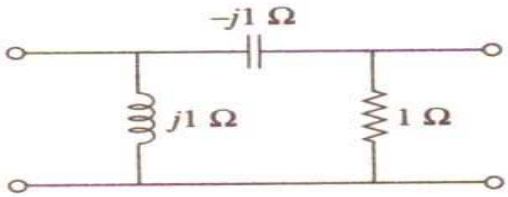
4 In fig shown below with switch open, steady state is reached with V = 100 sin (314 t) volts. The switch is closed at t = 0. The circuit is allowed to come to steady state again. Determine the steady state current and complete solution of transient current.



5 Determine the h-parameters for the circuit shown below:



6 Determine the Z-parameters of the two-ports shown below:



7 Sketch the diagram of a saw-tooth wave form. Derive its Fourier series.

8 (a) Derive the Fourier transform of the double-sided exponential $e^{-a(t)}$.

(b) Derive the Fourier transform of saw-tooth pulse, $p(t) = 10 + [u(t) - u(t-2)]$

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

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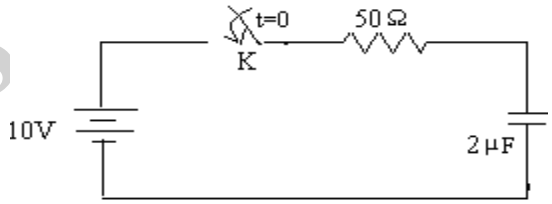
1 (a) Explain the three watt meter method measurement of power with a neat diagram.

(b) Three coils each having a resistance of 20 Ω and an inductive reactance of 15 Ω are connected in delta and fed by a 3-phase, 400 V, 50 Hz system. Find (i) Line current (ii) Power and (iii) Power factor

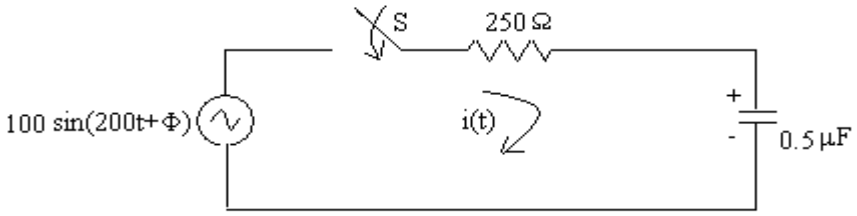
2 A symmetrical 3-phase, 100 V, three wire supply feeds an unbalanced star connected load, with impedances of the load as, $Z_R = 5\angle 0^0$, $Z_Y = 2\angle 90^0$ and $Z_B = 4\angle -90^0$ ohms. Find the (i) Line currents. (ii) Voltage across the impedances. (iii) The displacement neutral voltage by using star-delta conversion method.

3 (a) Obtain the expression for i(t) in a series R-C circuit is exited with a dc voltage source V, when the switch is closed at time t = 0.

(b) In the circuit shown in fig below, switch 'K' is closed at t = 0. Find the values of i, di/dt and d^2i/dt^2 at $t = 0^+$.



4 In the RC circuit shown in the fig below, the capacitor has an initial charge $Q_0 = 25 \times 10^{-6}$ C with polarity as shown. A sinusoidal voltage V = 100 sin (200t + Φ) is applied to the circuit at a time corresponding to $\Phi = 30^0$. Determine the expression for the current i(t).



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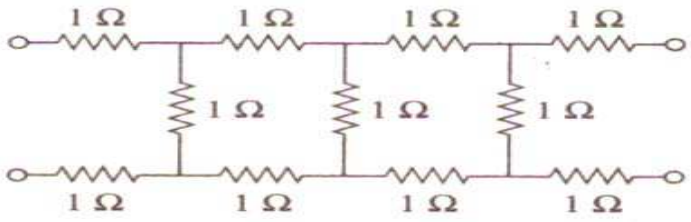
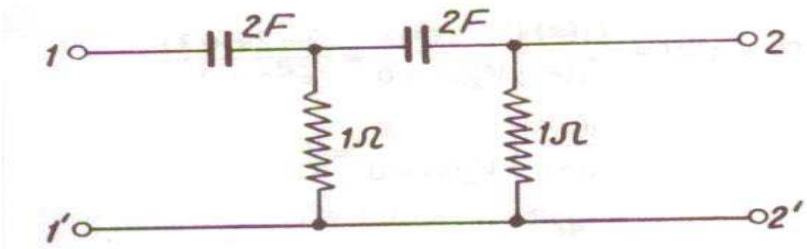
5 Find the impedance parameters of the network shown below:



6 Find the y-parameters for the following network.



7 Determine the Fourier series for the half-wave rectified cosine function.

8 Discuss the time integration and Frequency differentiation properties of Fourier transform.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

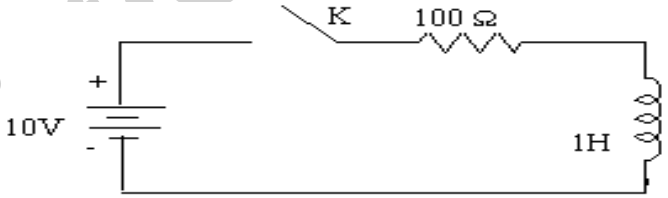
1 (a) Derive the relation between phase and line values of a three phase delta connected balanced system.

(b) Three inductive coils, each with a resistance of 15 Ω and an inductance of 0.03 H are connected in star to three phase, 400 V, 50 Hz supply. Calculate (i) phase current and line current. (ii) total power absorbed.

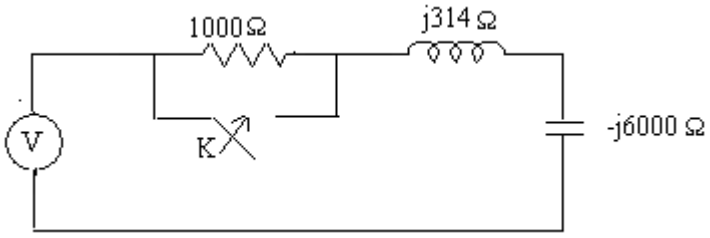
2 Three impedances of (7 + j4) Ω; (3 + j2) Ω and (9 + j2) Ω are connected between neutral and the red, yellow and blue phases, respectively of a 3-phase, four wire system. The line voltage is 440 V. Calculate (i) The current in each line and (ii) The current in the neutral wire.

3 (a) Derive the expression for i(t) in a series R-C circuit is exited with a dc voltage source V, when the switch is closed at time t = 0.

(b) In the circuit shown in fig below, switch 'K' is closed at t = 0. Find the values of i, di/dt and d^2i/dt^2 at $t = 0^+$.



4 In fig shown below with switch open, steady state is reached with V = 100 sin (314t) volts. The switch is closed at t = 0. The circuit is allowed to come to steady state again. Determine the steady state current and complete solution of transient current by using Laplace transform method.



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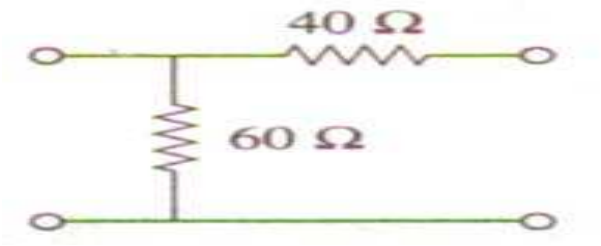
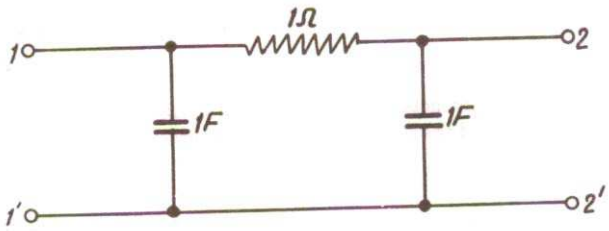
5 Find the h parameters for the network shown below:



6 Find ABCD parameters for the following network:



7 Derive the Fourier series of a half-wave rectified sine wave.

8 Determine the inverse Fourier transform of:

(a) $F(w) = 4\delta(w+3) + \delta(w) + 4\delta(w-3)$

(b) $H(w) = 6\cos 2w$

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