Code No: R22025 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations January - 2014
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) What happens to the quantity of power supplied by a three phase, three wire system to a balanced load if one phase is disconnected? Explain in detail with justifiable equations.
   b) A three phase three wire balanced star connected supply of voltage V is connected to a three phase balanced star connected load of impedance Z per each phase. Derive the potential difference between the star point of the supply and star point of load?

2. A 50 Hz, three phase, three wire system with terminals labeled 1,2,3 has an effective line voltage 400 V. To determine if the system is ABC or CBA, the circuit of below figure (1) is tested. Find the effective voltage between node 4 and line 2 if the system is a) ABC b) CBA

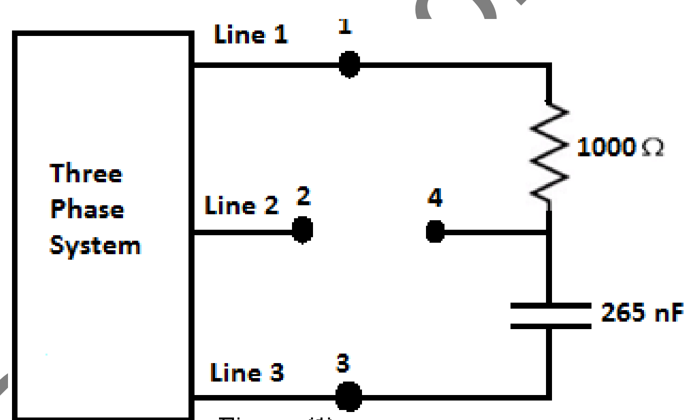

Figure (1)

3. In the network shown in figure(2) below, initial values $i_1(0) = 20$ mA and $i_2(0) = 15$ mA,
   a) Determine v(0) b) Find v(15μs) c) At what time is v(t) = 0.1v(0)

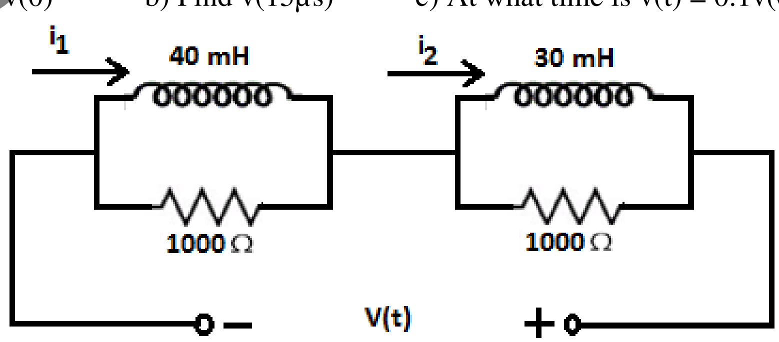

figure (2)
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4. Find an expression for V(t) in the circuit shown in the figure (3) below valid for all time?

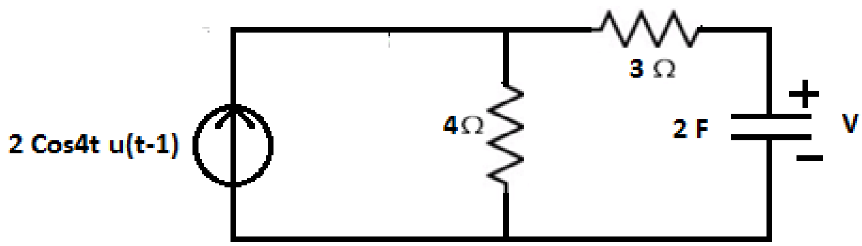

Figure (3)

5. Find the Z and Y parameters if they exist for the network shown in the figure (4) below

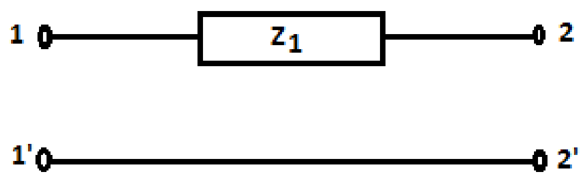

Figure (4)

6. Two networks A and B shown in figure (5) are connected in cascade by connecting the ports 2 and 3. If there exists find: a) Open circuit reverse transfer impedance b) short circuit forward transfer admittance c) short circuit transfer impedance d) short circuit input impedance e) open circuit reverse voltage gain

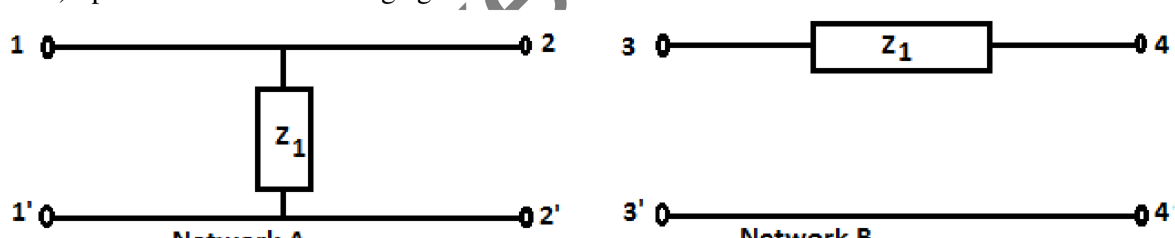

Figure (5)

7. Sketch each of the functions described below, state whether or not even symmetry, odd symmetry and half-wave symmetry present
a) v = 0, for -2<t<0 and 2<t<4; v = 5, for 0<t<2; v = -5, for 4<t<6; repeats;
b) v = 10, for 1<t<3; v = 0, for 3<t<7; v = -10, for 7<t<9; repeats;
c) v = 8t, for -1<t<1; v = 0, for 1<t<3; repeats;

8. Find the Fourier transform of the following functions:

a) $\delta(t-t_0)$ b) $e^{j\omega_0 t}$ c) $\cos\omega_0 t$

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1. a) Determine the change in average power delivered to a three phase balanced load if the line voltage is multiplied by a factor K? Explain in detail with justifiable equations.
   b) Prove that the current in neutral line connected between the star point of the balanced star connected load to the star point of balanced star connected supply is zero.

2. A 50 Hz, three phase, three wire system with terminals labeled 1, 2, 3 has an effective line voltage 200 V. To determine if the system is ABC or CBA, the circuit of below figure (1) is tested. Find the effective voltage between node 4 and line 2 if the system is a) ABC b) CBA

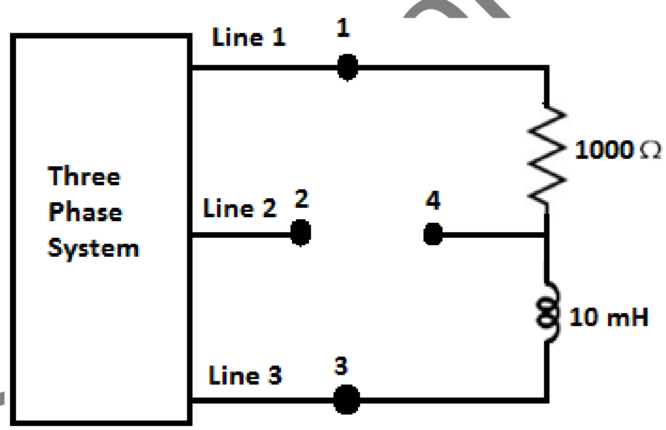

figure (1)

3. In the network shown in figure(2) below, initial values $i_1(0) = 20$ mA and $i_2(0) = 15$ mA,
   a) Determine v(0) b) Find v(25μs) c) At what time is v(t) = 0.5v(0)

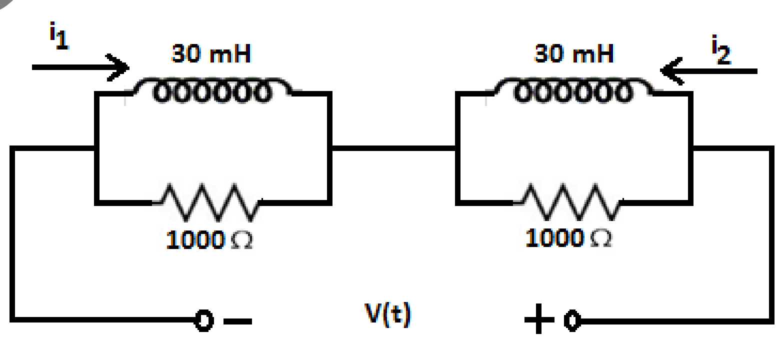

figure (2)
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4. Find an expression for i(t) in the circuit shown in the figure (3) below valid for all time?

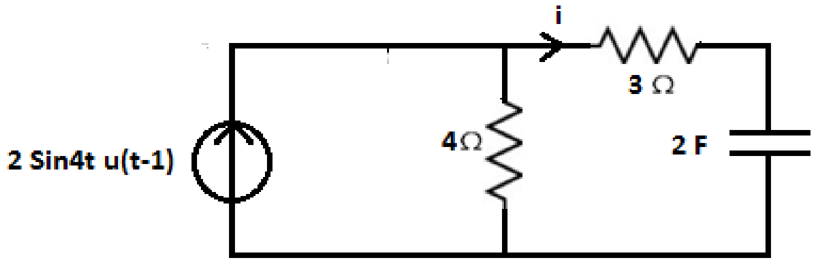

Figure (3)

5. Find the Z and Y parameters if they exist for the network shown in the figure (4) below

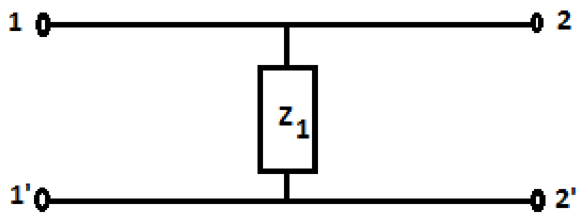

Figure (4)

6. Two networks A and B shown in figure (5) are connected in cascade by connecting the ports 2 and 3. If there exists find: a) Open circuit reverse transfer impedance b) short circuit forward transfer admittance c) short circuit transfer impedance d) short circuit input impedance e) open circuit reverse voltage gain

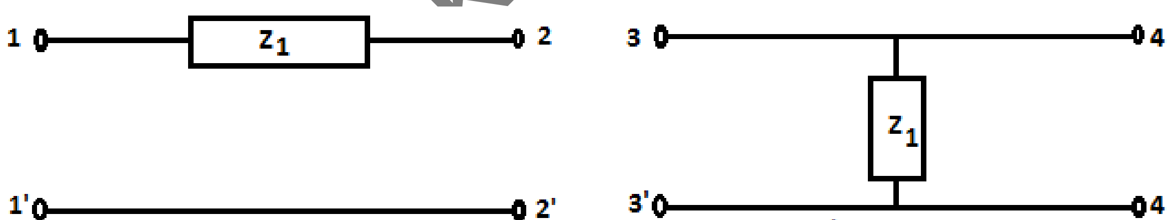

Figure (5)

7. Determine the Fourier series for the waveforms described below
 a) v = 0, for $-2<t<0$ and $2<t<4$; v = 5, for $0<t<2$; v = -5, for $4<t<6$; repeats;
 b) v = 10, for $1<t<3$; v = 0, for $3<t<7$; v = -10, for $7<t<9$; repeats;

8. Find the Fourier transform of the following functions
 a) 1 b) Signum function c) Unit step function

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Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
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1. a) Prove that the power delivered to any phase of a three phase balanced load is same as that of remaining phases when supplied by three phased balanced supply with necessary mathematical equations.
   b) Derive the relationship between line current and phase current in a three phase delta connected balanced load when supplied from a balanced supply

2. A 60 Hz, three phase, three wire system with terminals labeled 1,2,3 has an effective line voltage 400 V. To determine if the system is ABC or CBA, the circuit of below figure (1) is tested. Find the effective voltage between node 4 and line 2 if the system is a) ABC b) CBA

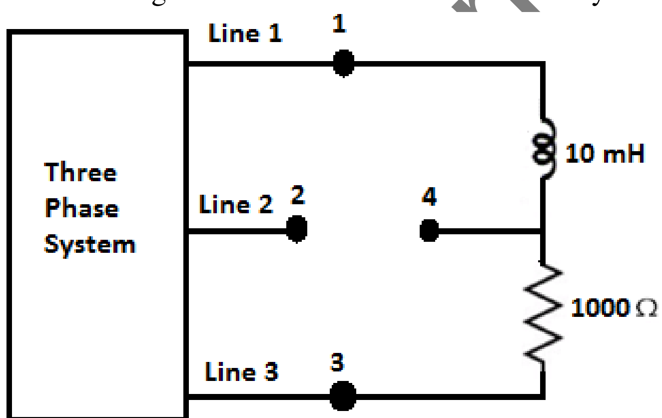

figure (1)

3. In the network shown in figure (2) below, initial values $V_1(0) = 20$ V and $V_2(0) = 15$ V,
   a) Determine V(0) b) Find V(15 milli sec) c) At what time is V(t) = 0.1V(0)

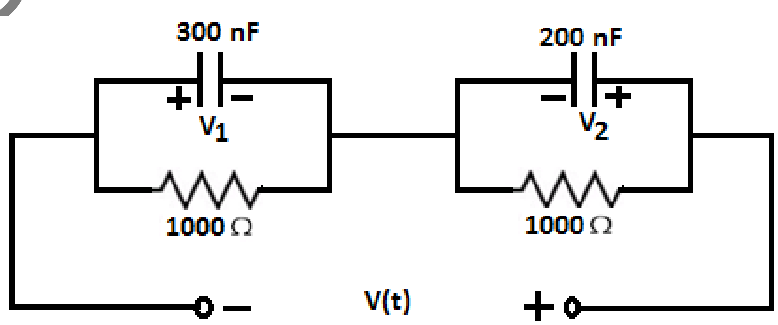

figure (2)
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4. Find an expression for i(t) in the circuit shown in the figure (3) below valid for all time?

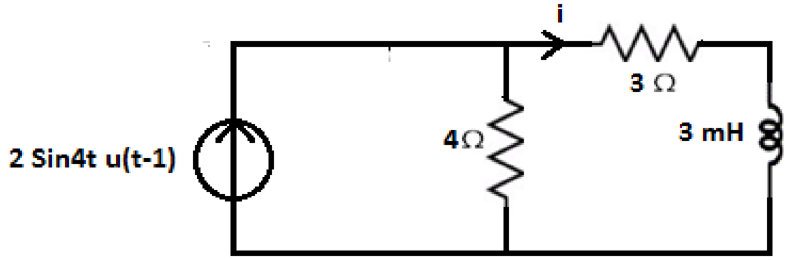

Figure (3)

5. For the network shown in the figure (4) below, if they exist determine the values of
 a) Open circuit reverse transfer impedance b) short circuit forward transfer admittance c) short circuit transfer impedance d) short circuit input impedance e) open circuit reverse voltage gain

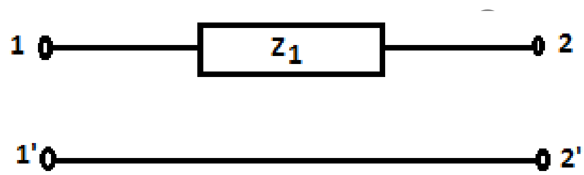

Figure (4)

6. Two networks A and B shown in figure (5) are connected in cascade by connecting the ports 2 and 3. If there exists find transmission parameters and then with those values find Y parameters

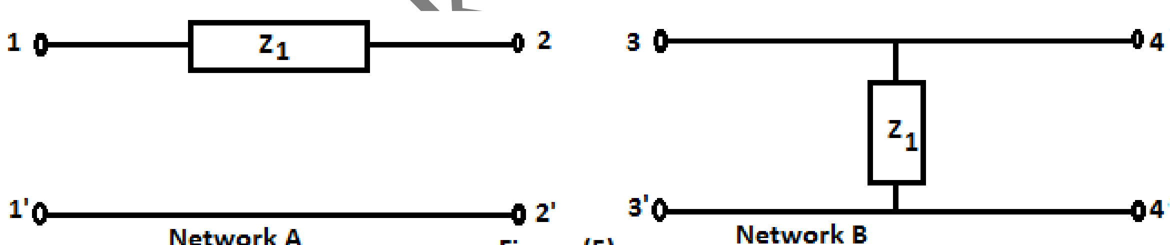

Figure (5)

7. In the Fourier series expansion of the functions given below, calculate $a_0, a_1, a_2, b_1, and\ b_2$
 a) 3 b) 3 cos 3t c) 3 sin 3t

8. Find the Fourier transform of the following functions
 a) $e^{-at}\ u(t)$ b) $[e^{-at}\ \cos\omega_d t]\,u\,(t)$ c) $u\,(t+\frac{1}{2}T)-u(t-\frac{1}{2}T)$

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ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
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1. a) Consider in a three phase balanced system, the power delivered to a three phase balanced load of impedance Z per each phase when connected in star connection is P. What will be the power delivered to the balanced load of impedance Z per each phase when connected in delta connection if the supply remains same?
   b) Derive the relationship between line voltage and phase voltage in a three phase star connected balanced load when supplied from a balanced supply

2. A 50 Hz, three phase, three wire system with terminals labeled 1,2,3 has an effective line voltage 400 V. To determine if the system is ABC or CBA, the circuit of below figure (1) is tested. Find the effective voltage between node 4 and line 2 if the system is a) ABC b) CBA

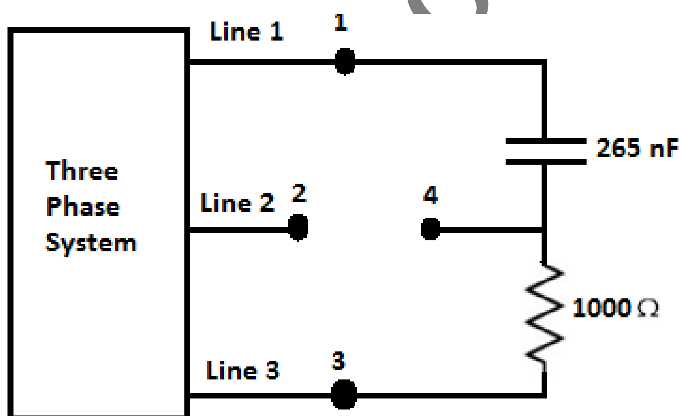

figure (1)

3. In the network shown in figure(2) below, initial values $V_1(0) = 30$ V and $V_2(0) = 45$ V,
   a) Determine v(0) b) Find v(25 milli sec) c) At what time is v(t) = 0.5v(0)

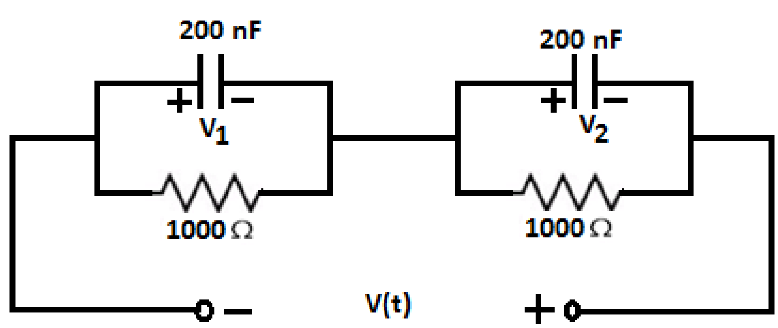

figure (2)
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4. Find an expression for V(t) in the circuit shown in the figure (3) below valid for all time?

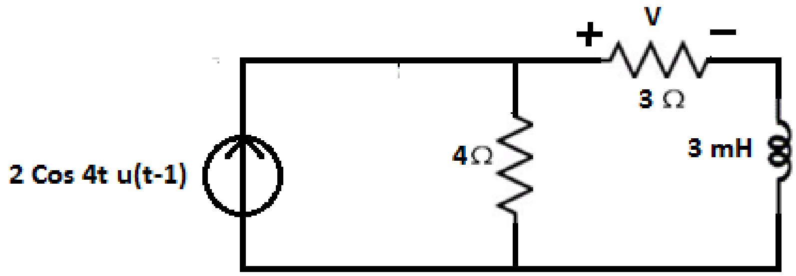

Figure (3)

5. For the network shown in the figure (4) below, if they exist determine the values of
   a) Open circuit reverse transfer impedance b) short circuit forward transfer admittance c) short circuit transfer impedance d) short circuit input impedance e) open circuit reverse voltage gain

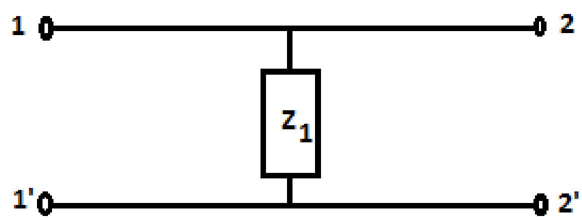

Figure (4)

6. Two networks A and B shown in figure (5) are connected in cascade by connecting the ports 2 and 3. If there exists find transmission parameters and then with those values find Z parameters

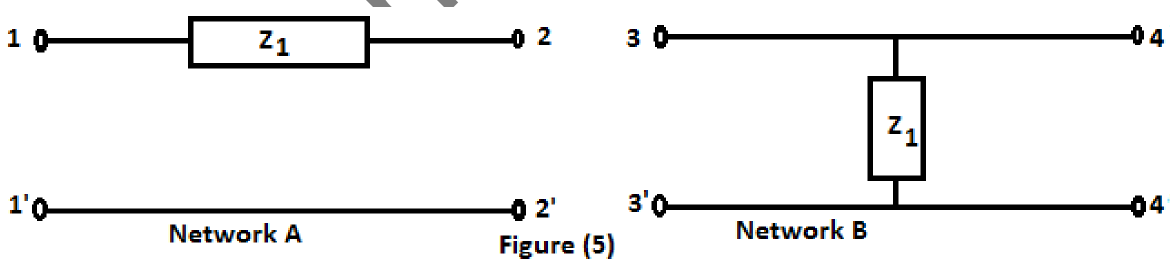

Figure (5)

7. In the Fourier series expansion of the function given below, calculate

$$h(t) = -3 + 8\sin 2t + f(t),$$

$$where\ \ f(t) = u(t-1) - u(t-2) + u(t-3) - u(t-4) + \cdots \ \ldots\ \ldots\ \ldots\ \ldots$$

8. Given the time function $f(t) = 5\,[u\,(t+3) + u\,(t+2) - u\,(t-2) - u\,(t-3)]$;
   a) Sketch f(t) b) Use the definition of Fourier transform to find $F(j\omega)$