Total No. of Questions :09] [Total No. of Pages : 02

II/IV B.Tech. DEGREE EXAMINATIONS, DECEMBER- 2016

First Semester

EC/EE

NETWORK THEORY

Time: Three Hours **Maximum marks:60**

Answer Question No.1 Compulsory. **12X1=12 M**

Answer One Question from each Unit. **4X12=48 M**

1. a) What are coupled circuits
   b) Define RMS value.
   c) Concept of network.
   d) State current division rule.
   e) Define an ideal current source.
   f) What is a dual network?
   g) Define Average value.
   h) What is Band width and Selectivity?
   i) Mention the properties of a series RLC circuit.
   j) Explain how voltage source with a source resistance can be converted into an equivalent current source.
   k) State Thevenin's theorem.
   l) Define time constant of RL circuit

UNIT-I

2. a) Explain the principles of duality? Write a graphical procedure to draw a dual network.
   b) Discuss in detail about the series and parallel connections of two coupled coils.

(OR)

3. a) State and explain star-delta conversion in AC systems.
   b) Two identical coupled coils in series has an equivalent inductance values of 0.2 H and 0.03 H, Find the values of L1, L2, M and K.

UNIT-II

4. a) Derive the expression for complex impedance of an RLC series circuit.
   b) A current of 15 A flows through a non inductive resistance in series with a chocking coil when supplied at 230 V, 50 Hz. If the voltage across the non inductive resistance is 120 V and that across the coil 20V, calculate Impedance, Reactance and Resistance of the coil, and power absorbed by the coil. Also draw the phasor diagram.

P.T.O

(OR)

5. a) Derive the expression for sinusoidal response of parallel RLC circuit.

   b) A coil having a resistance of 50 ohms and an inductance of 0.02 H is connected in parallel with a capacitor of 25 « F,across a 200V 50 Hz supply. Find the current in the coil and the capacitor. Also find the total current taken from the supply, the overall power factor and total power consumed. Draw the phasor diagram.

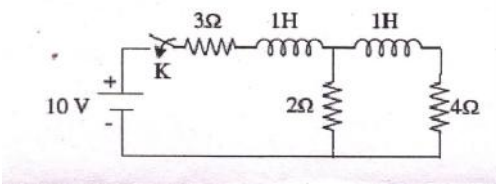
UNIT-III

6. a) What is time constant? What are the time constant of series R-L and R-C circuit?

   b) In a series RLC circuit, R=6 ohms, L=2H, C=3 F. A DC voltage of 20V is applied at t=0. Obtain the expression for i(t) using differential equation approach. Explain the procedure to evaluate conditions.

(OR)

7. Using Laplace transformation technique, find current in each loop at t=0+ following switching at t=0 of switch K is shown in below figure. Assume the network previously deenergized.

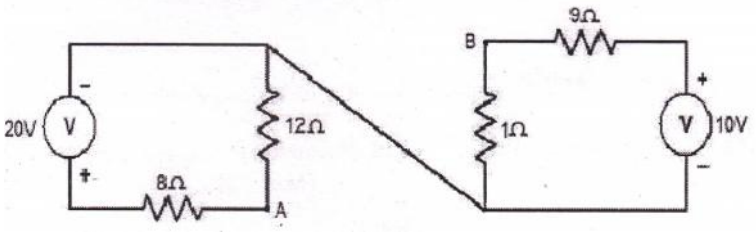


UNIT-IV

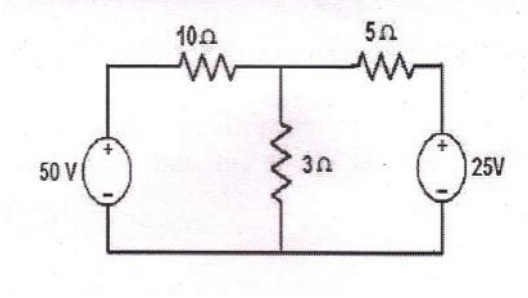
8. Derive bandwidth for a series RLC circuit as a function of resonant frequency.

(OR)

9. a) Determine Thevenin's equivalent across the terminals AB for the cirucit shown in Figure below.



   b) Find the current through the 3ohms resistor as shown in below figure using superposition theorem.



Total No. of Questions :09] [Total No. of Pages : 04

II/IV B.Tech. DEGREE EXAMINATIONS, DECEMBER- 2016

First Semester

EE/EC/EI

CIRCUIT THEORY

Time: Three Hours **Maximum marks:70**

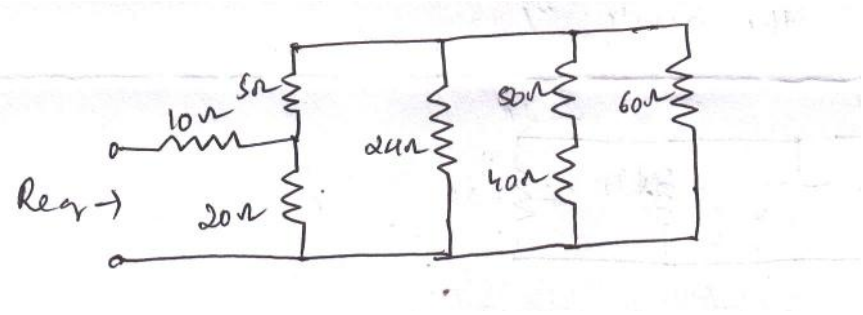
Answer Question No.1 Compulsory. **14X1=14 M**

Answer One Question from each Unit. **4X14=56 M**

1. a) Define current and write its equation
   b) State KCL and KVL
   c) Define form factor
   d) What is the power factor of a purely inductive load?
   e) State Thevinin's theorem.
   f) What is the Laplace transform of u(t-T)?
   g) How much of the reactive power absorbed by the inductor is supplied by the main voltage source in a series RLC circuit at resonance?
   h) Define and write the equation for time constant of an R-L circuit.
   i) Define cut set matrices.
   j) State final value theorem
   k) What is complex theorem.
   l) Define power and energy.
   m) What is bandwidth?
   n) Define passive elements.

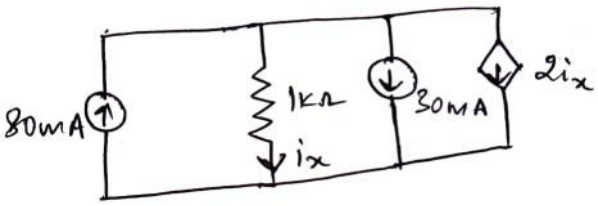
UNIT-I

2. a) Find R_{eq} for the following circuit.



P.T.O

b) Find the power absorbed by the dependent current source.

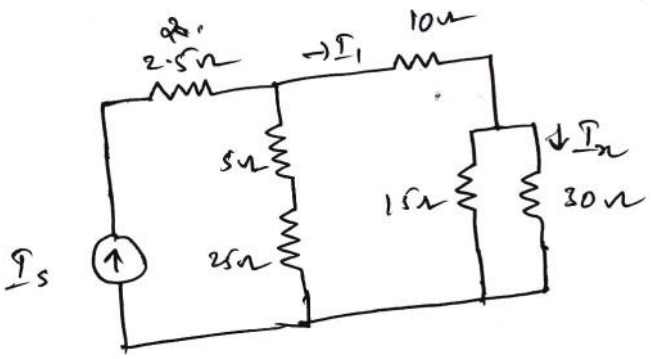


(OR)

3. With reference to the circuit shown find

(a) I_x if I_1=12mA and

(b) I_x if I_s=60mA



UNIT-II

4. a) Transform each of the following functions of time into phasor form:

(a) -5sin (580t-110^O); (b) 3 cos600t-5sin (600t+110^O)

(c) 8 cos (4t-30^O)+4sin(4t-100^O)

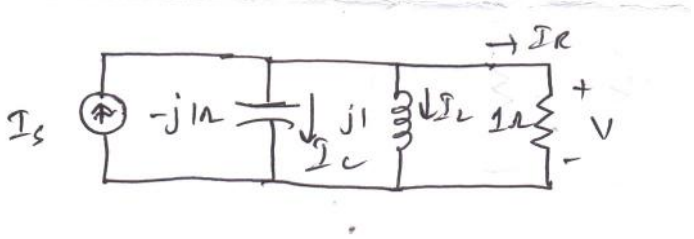
b) Let w=2000 rad/s and t=1 ms. Find the instantaneous value of each of the currents given here in phasor form:

(a) j10A; (b) 20+j10A; (c) 20+jj (10 $\angle 20^O$)

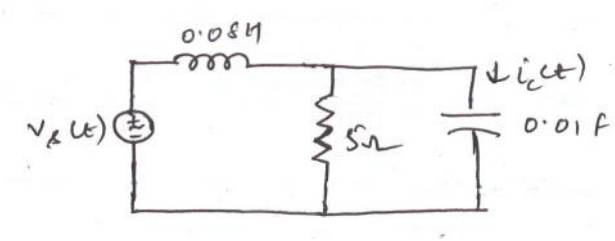
(OR)

5. a) Let V=10 $\angle 0^O$ V. In the circuit of the fig. below, construct a phasor diagram showing I_R,I_L and I_C. By combining these currents, determine the angle by which I_S leads

(a) I_R, (b) I_C, (c) I_L

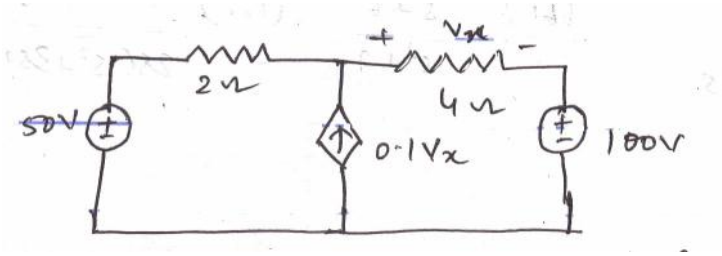


b) In the circuit shown below, let i_c be expressed as $i_c(t)=20\cos(40t+30^O)$A. Find $V_s(t)$.



UNIT-III

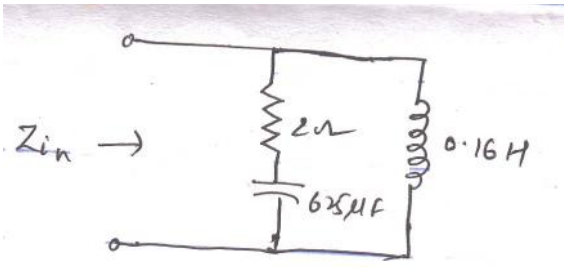
6. a) Use superposition to evaluate Vx in the circuit shown



b) State and explain Norton's theorem

(OR)

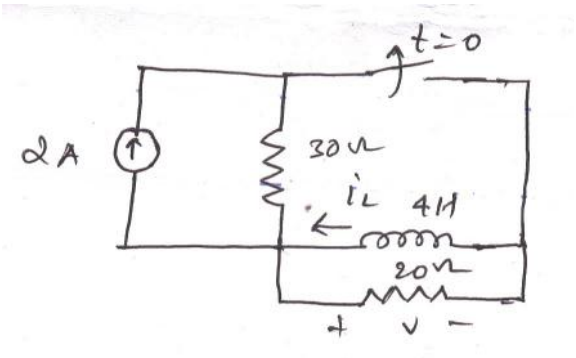
7. a) Find the resonant frequency and the value of Z_{in} at resonance.



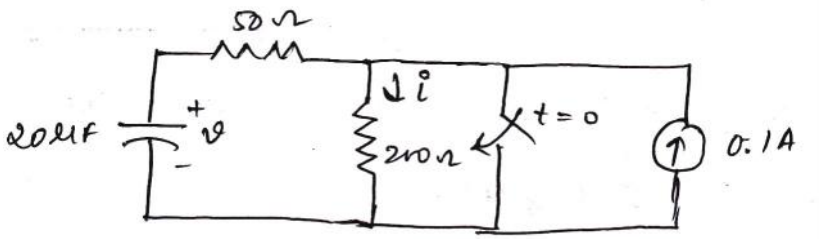
b) Define and derive the expression for bandwidth in a series RLC circuit.

UNIT-IV

8. a) Determine the value of i_L at the instant just after switch changes



b) Find i (0+), i(0-), V(0+), V(2ms) and V(t) for t >0 in the following circuit.



(OR)

9. a) Find f(t) if f(s) equals to

i) $\frac{1}{S(S+1)(S+2)}$ ii) $\frac{S}{(S+1)(S+2)}$ iii) $\frac{S+1}{S(S+2)}$

b) Find f(0+) and f(∞) for the following transforms

i) $F(s)=\frac{4e^{-2s}}{(S+50)\times S}$ ii) $\frac{S^2+6}{S^2+7}$ iii) $\frac{5S^2+10}{2S(S^2+3S+5)}$

Total No. of Questions :09] [Total No. of Pages : 04

II/IV B.Tech. DEGREE EXAMINATIONS, DECEMBER- 2016

First Semester

EC/EE/EI

CIRCUIT THEORY

Time: Three Hours **Maximum marks:70**

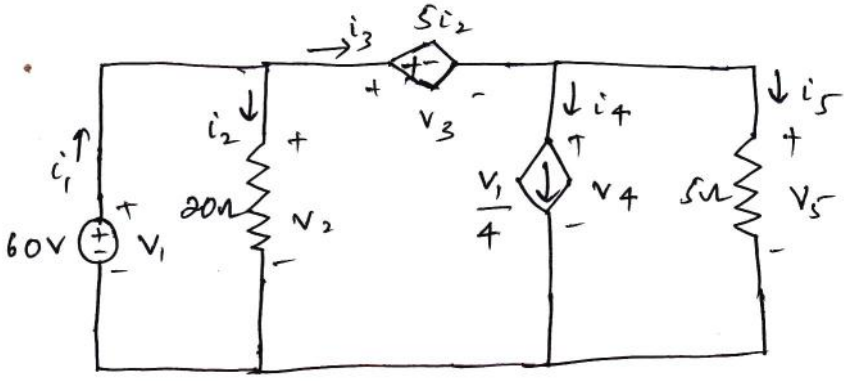
Answer Question No.1 Compulsory. **14X1=14 M**

Answer One Question from each Unit. **4X14=56 M**

1. a) Define active and passive elements
   b) Explain the purpose of star-delta transformation
   c) State maximum power transfer theorem.
   d) Define form factor.
   e) Defin tree, branch and link
   f) Write an expression for energy stored in capacitor.
   g) What is selectivity?
   h) Obtain Laplace transform of $f(t) = e^{-at}$, a>0
   i) Define transient
   j) What is the phase difference between voltage and current waveforms for a purely capacitive load.
   k) What is the laplace transform of an impulse signal delayed by 2 seconds?
   l) State Millman's theorem
   m) What is a super node?
   n) What is source transformation?

UNIT-I

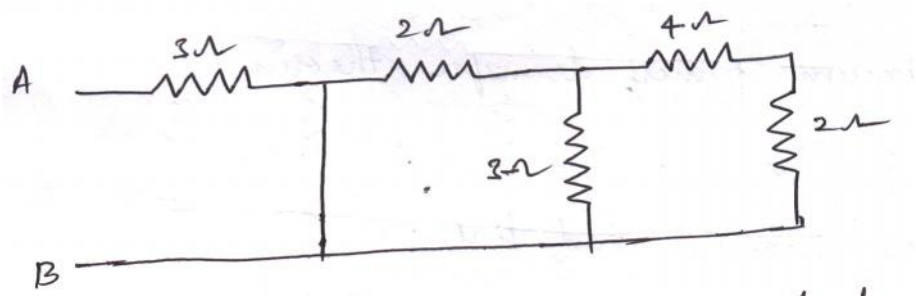
2. Use Kirchoff's and Ohm's laws in a step-by-step procedure to evaluate all the currents and voltages in the circuit shown below. Calculate the power absorbed by each of the five circuit elements and show that the sum is zero.



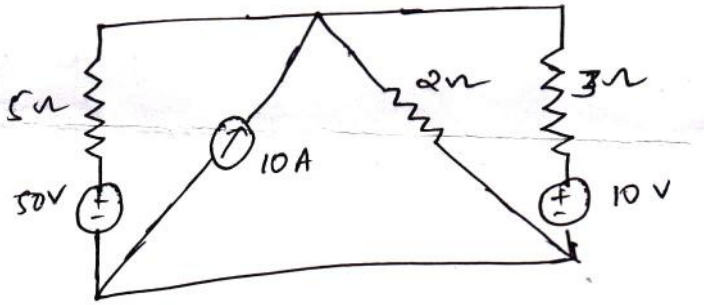
P.T.O

(OR)

3. a) Find the effective resistance across terminals AB of the circuit shown



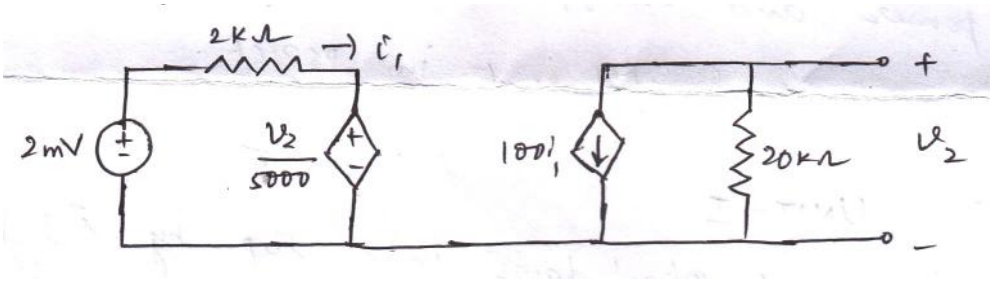
b) Using source transformation find the power delivered by the 50V source in the given network.



UNIT-II

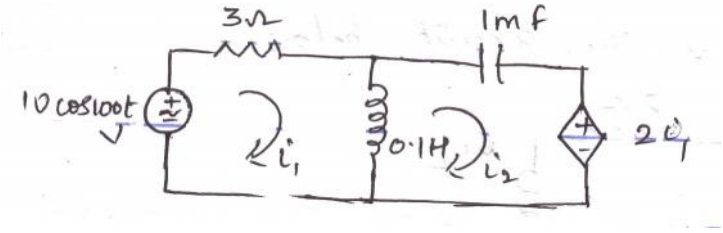
4. a) State and explain Ihevenin's theorem

b) The circuit below shows one form of the equivalent circuit for a transistor amplifier. Determine the open circuit value of V_2 and the output resistance (R_{th}) of the amplifier.



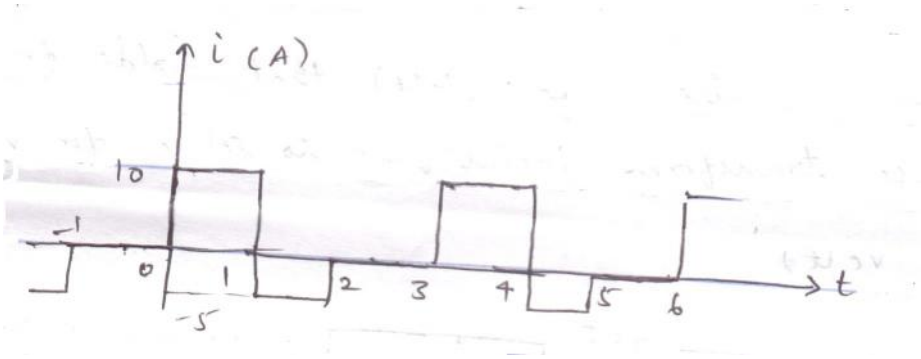
(OR)

5. Find the loop currents i_1 and i_s in the following circuit

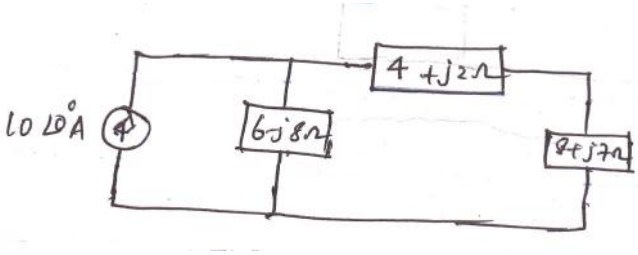


UNIT-III

6. a) Determine the average power delivered to a 5Ω resistor by the periodic waveform shown



b) Determine the average power delivered to each of the boxed networks in the circuit.



(OR)

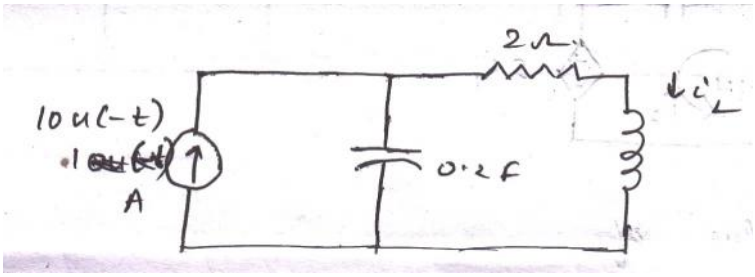
7. a) A series resonant circuit has a bandwidth of 100Hz and contains a 20mH inductance and a 2 « F capacitance. Determine :(i) f_0, (ii) Q_0; (iii) Z_{in} at resonance (iv) f_2 where f_0 is the resonant frequency.

b) Draw the impedance curve and current curve for a series RLC circuit and explain its equation.

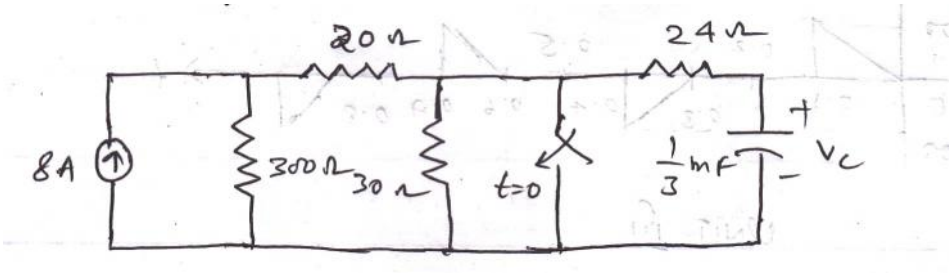
P.T.O

UNIT-IV

8. a) Find $i_L(t)$ for t>0 in the circuit below



b) Find Vc(t) for all time in the circuit.

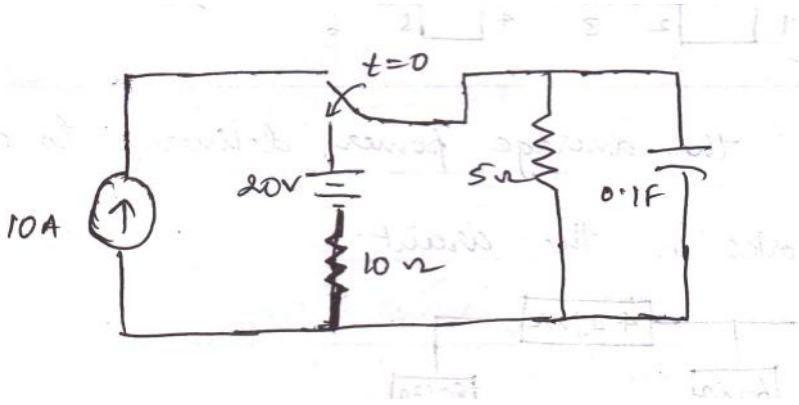


(OR)

9. a) Find $Vc(0^-)$ and $Vc(0^+)$ for the circuit shown below.

b) Obtain an equation for Vc(t) that holds for t>0

c) Use laplace transform techniques to solve for $V_c(s)$ and then find $V_c(t)$



Total No. of Questions :09] [Total No. of Pages : 03

II/IV B.Tech. DEGREE EXAMINATIONS, APRIL/MAY- 2016

First Semester

EE/EC/EI

CIRCUIT THEORY

Time: Three Hours **Maximum marks:70**

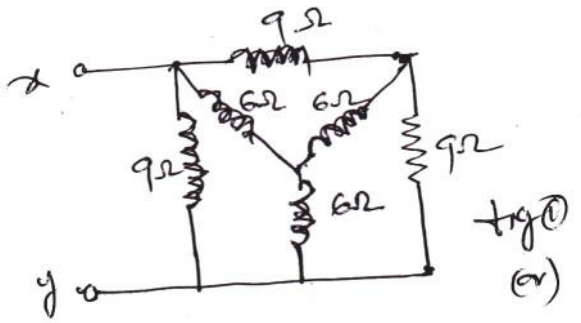
Answer Question No.1 Compulsory **14X1=14 M**

Answer ONE question from each Unit **4X14=56 M**

1. a. Define KCL and KVl
   b. Define trace, twig and link
   c. State millman's theorem
   d. Define transient responce?
   e. Define power factor
   f. What is the phase relationship for a pure inductor?
   g. Define Quality factor
   h. State final value theorem
   i. What is the "form factor" for sinusoidal wave?
   j. What is selectivity?
   k. What is source tranformation.
   l. What is laplace transform of $f(t) = 1 - e^{-at}$
   m. Define "DC sweep" statement in PSPICE?
   n. Define Reciprocity theorem?

UNIT-I

2. a. Derive an expression for energy stored in a capacitor and draw it responce characteristics.
   b. Find the equivalent resistance of Network shown in fig(1)

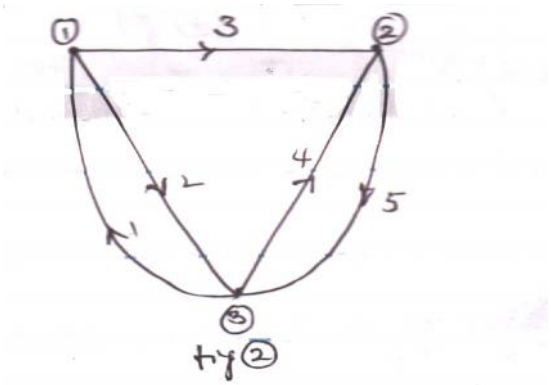


P.T.O

(OR)

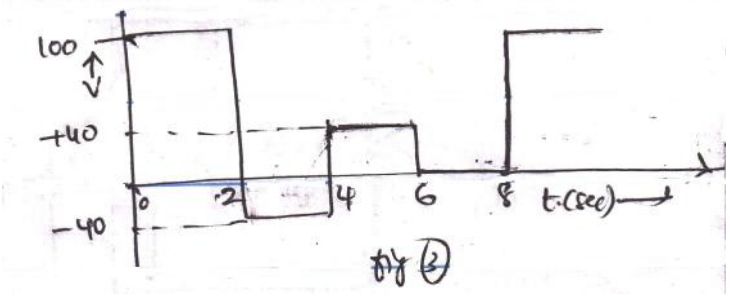
3. a. What is fundamental Tie-set matrix? Explain the procedure to determine Tie-set matrix.

   b. Develop the fundamental cut-set matrix and equilibrium equation on nodal basis.



UNIT-II

4. a. Detemine R.M.S average value and form factor of the wave form given in fig.(3).

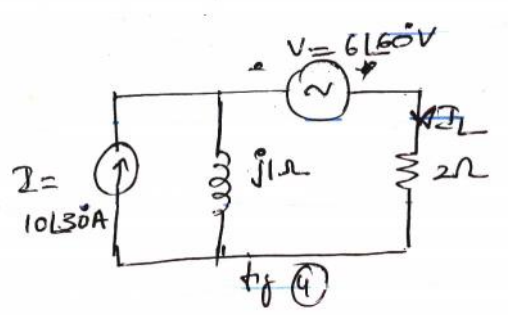


   b. A resistor of 10 Ω, an inductance of 150 mH and a cpacitor of 100 « F are connected across a 50V, 50Hz voltage sources. Find the branch currents and total current. Draw the phasor diagram?

(OR)

5. a. Explain Impedance and Power triangles?

   b. Obtain the values of the complex power of the sources shown in fig(4).



P.T.O

UNIT-III

6. a. State and prove superposition theorem?

   b. Find the Thevenin's equivalent of Network show in fig(5)

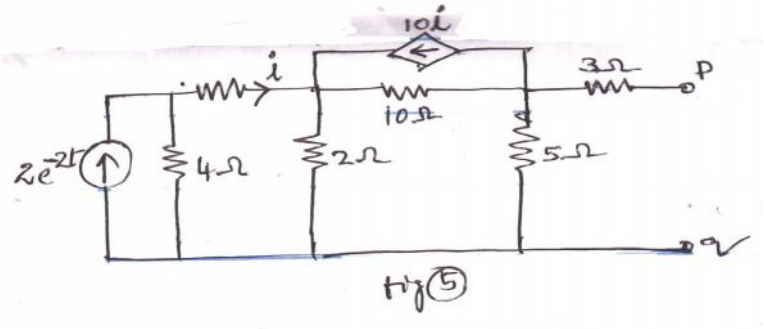


fig (5)

(OR)

7. a. Define Q-factor and Bandwidth? Derive necessary expression for it for series RLC circuit?

   b. Determine all the currents, in the resonant frequency, half power frequencies in the circuit show in fig.(6).

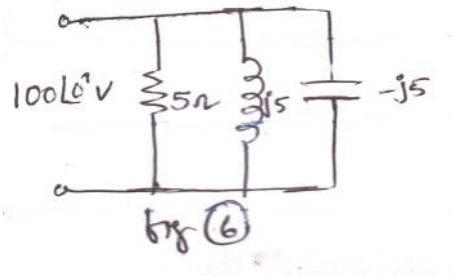


fig (6)

UNIT-IV

8. a. Derive an equation for step responce of series RC circuit in laplace domain.

   b. Find loop current i(t), following switching of k at t=0 in the circuit of fig (7) from A to B

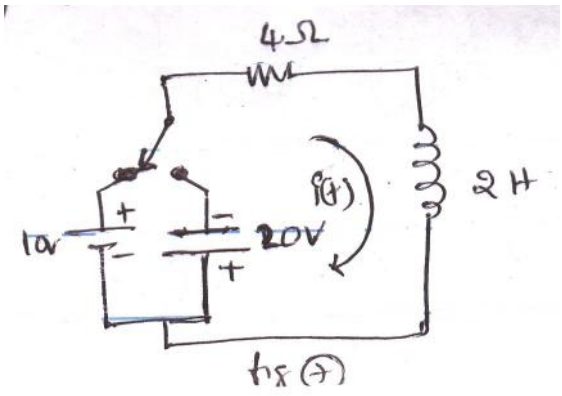


fig (7)

(OR)

9. a. A series RLC circuit has R=15 Ω, L=0.25 H and C=55 « F. A constant DC voltage of 200V is impressed upon the circuit at t=0. Find the expression for the transient current using laplace transformations. Assume zero initial conditions.

   b. Explain DC analysis and control statements in PSPICE.

Total No. of Questions :09] [Total No. of Pages : 03

II/IV B.Tech. DEGREE EXAMINATIONS, APRIL/MAY- 2016

First Semester

EC/EE/EI

CIRCUIT THEORY

Time: Three Hours **Maximum marks:70**

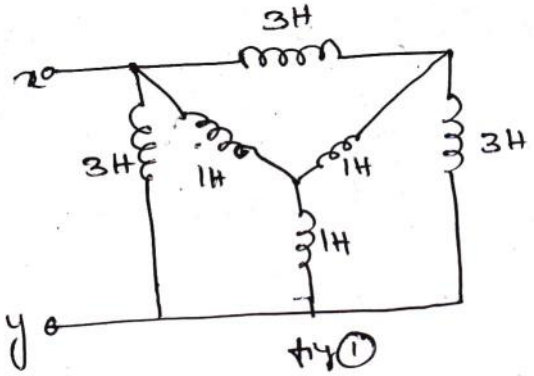
Answer Question No.1 Compulsory **14X1=14 M**

Answer ONE question from each Unit **4X14=56 M**

1. a. What is meant by Natural frequency?
   b. What is dual network
   c. What is a super node?
   d. State Millmen's theorem.
   e. Explain the purpose of star-delta transformation.
   f. Define cut-set matrix?
   g. What is twig, link.
   h. What is the difference between Active ans passive elements
   i. State final vlaue theorem.
   j. Define power factor
   k. Define Quality factor
   l. Write the laplace transform for ramp wave?
   m. What is magnification
   n. State Superposition theorem.

UNIT-I

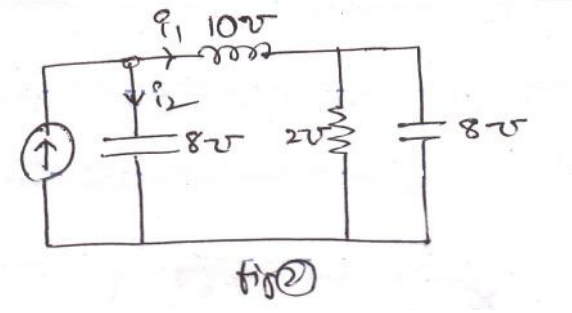
2. a. State and explain Kirchoff's laws wih relevent expressions?
   b. Obtian the equivalent inductance at terminal x,y in fig(1)



P.T.O

(OR)

3. a. Develop the fundamental cut-set matrix of the network shown in fig (2)



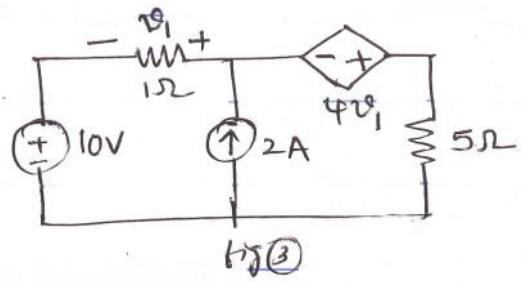
fig(2)

b. Define fundamental tie-set matrix and write the procedure to form tie-set matrix with an example?

UNIT-II

4. a. State and explain Thevenin's theorem. Also give an example.

b. Find the power loss in 5Ω resistor by superposition theorem. in fig(3)



fig(3)

(OR)

5. a. State and explain Reciprocity theorem.

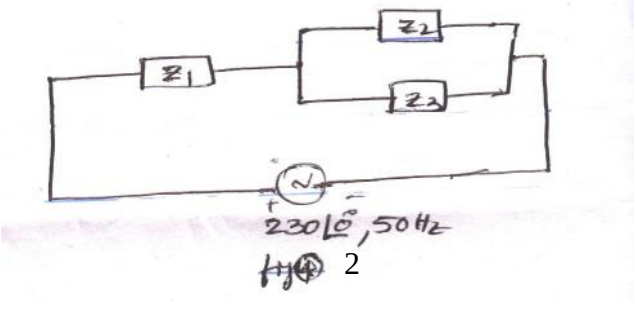
b. A voltage wave is represented by $v(t) = 200\sin(314t + 30^{O})$ find (i) maximum vlaue (ii) RMS value (iii) Average value (iv) frequency (v) time period (vi) Instantaneous value after 0.05 sec.

UNIT-III

6. a. Sate and prove maximum power transfer theorem for AC circuit?

b. Find Real and Reactive power in the network of fig(4)

$z_1 = (5 + j10)\Omega, z_3 = (1 + j3)\Omega, z_2 = (2 - j4)\Omega$



fig(4)

P.T.O

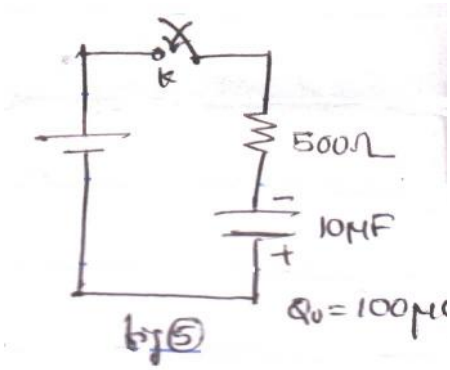
(OR)

7. a. Derive expression for Resonance frequency and Q-factor for parallel RLC circuit?

   b. Obtain the values of R,L,C in a series RLC circuit that resonates at 1.5 KHz and consumes 50W from a 50V, A.C source operating at the resonance frequency. The bandwidth is 0.75 KHz.

UNIT-IV

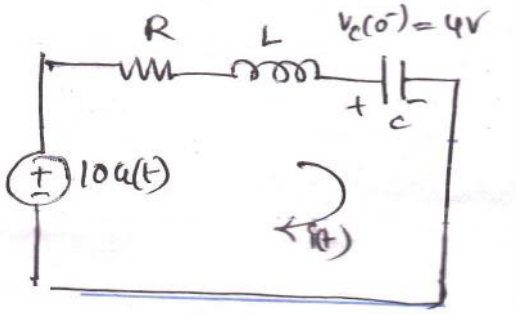
8. a. The 10 « F capacitor in RC circuit of fig(5)has initial charge of 100 « C with polarities as shown. At t=0, the switch being closed, A D.C voltage of 100V is applied. Find the expression for current.



   b. Derive step response of RLC series circuit in Laplace domain?

(OR)

9. a. In series RLC Network R=0.5 ΩC=1 F, L=1H. If the initial voltage on the capacitor is 4V. Find i (t) following switching of a voltage 10 u(t) into circuit. Assume zero initial conditions.



   b. Explain about describing dependent and independent current and voltage sources in PSPICE. Also give an example.