[06 BENG – 2101]

II/IV B.Tech. DEGREE EXAMINATION.

First Semester

Electrical and Electronics Engineering

NETWORK THEORY

(Effective from the admitted batch of 2015–2016)

me : Three hours Maximum : 70 marks

Question No. 1 is compulsory.

Answer any other FOUR questions.

All questions carry equal marks.

(a) Compare ideal, practical, dependent and independent sources.

(b) Derive energy stored in inductor and capacitor.

(c) State Max. Power transfer theorem.

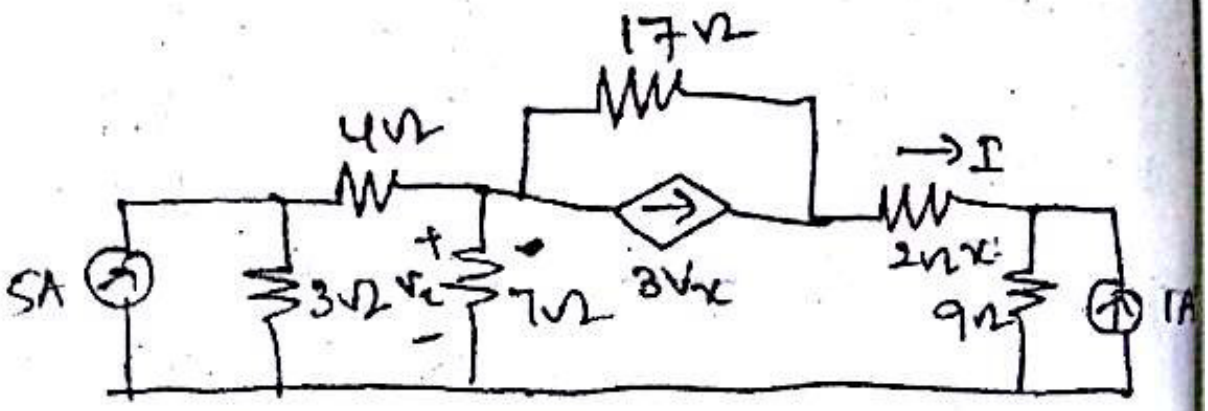
(d) Obtain the transient response for source free RLC series circuit.

(e) What is power factor?

(f) What is meant by quality factor?

(g) What is Laplace transform of unit Ramp and Impulse function?

2. (a) Using source transformation technique, current I in the given network.



(b) Using Star-Delta transformation fi equivalent resistance and total current the given network.

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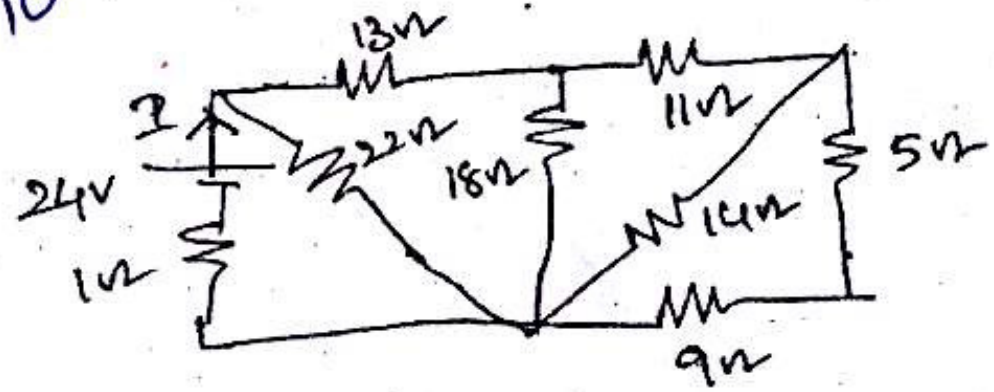
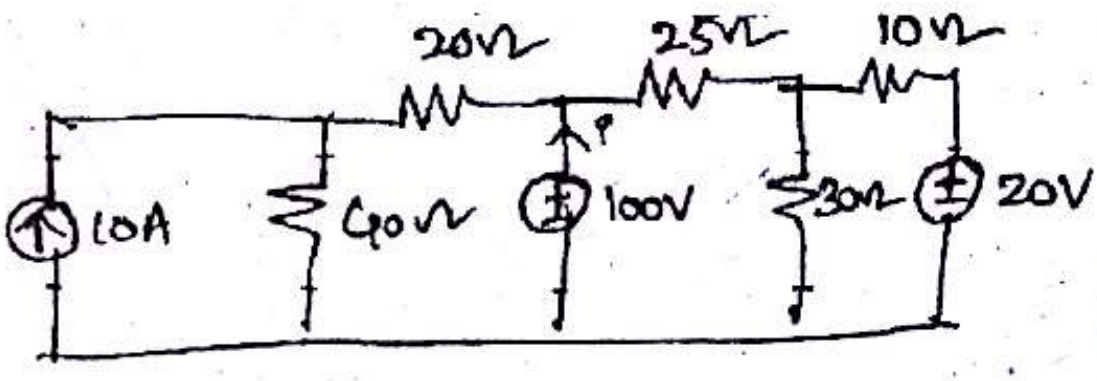
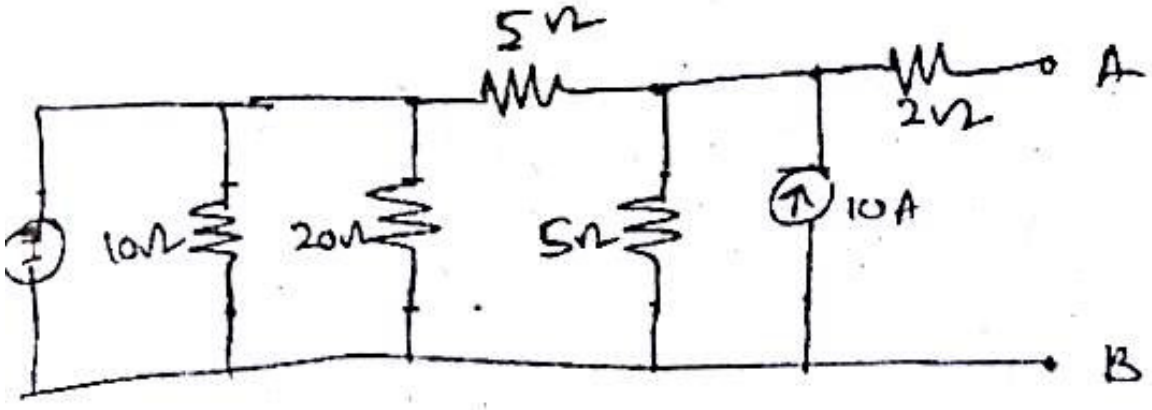


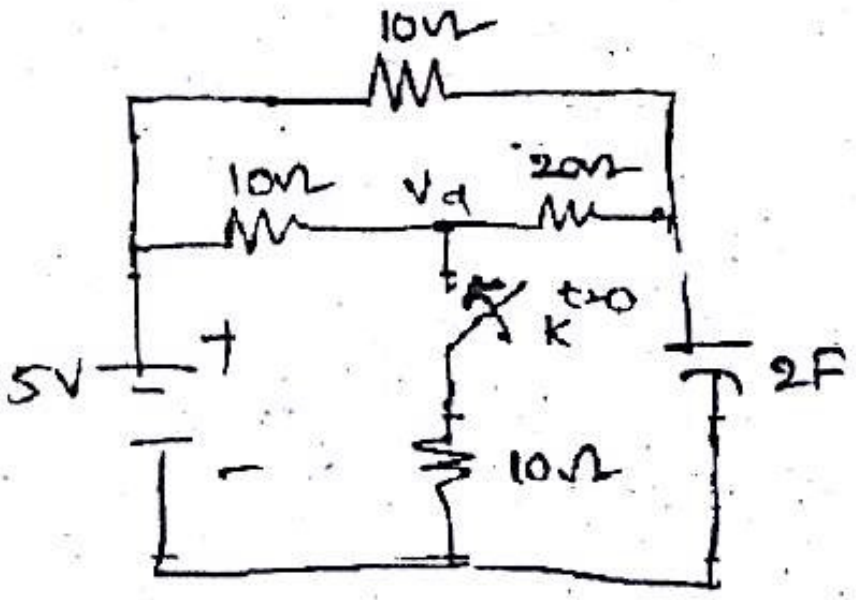
3. (a) State superposition theorem. Usin superposition theorem find the current i 100 V source.



(b) Obtain the Norton's equivalent at AB for the network shown.



The below network in which steady state is reached with switch K open at t = 0, the switch is closed. For the element values given, determine the values of $Va(0^+)$, $Va(0^-)$.



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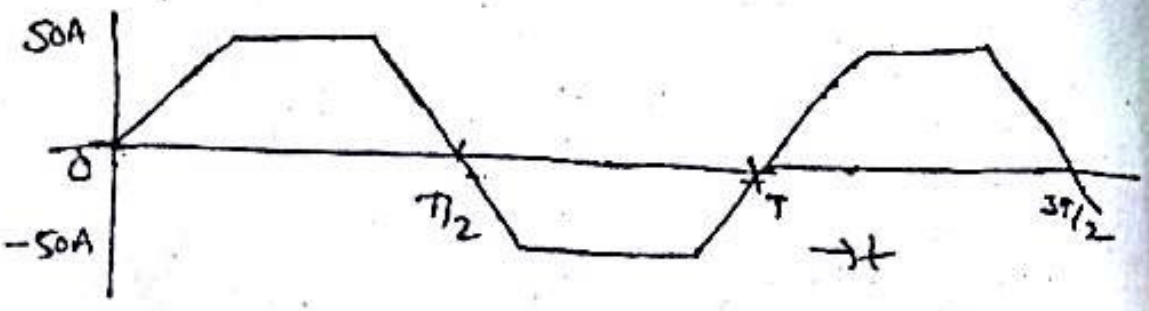
5. (a) Derive Avg. value and RMS value f sinusoidal wave. Also find agg. value ar RMS value for the given waveform.



(b) Explain power triangle. Calculate apparen power supplied by the source and find th average power, reactive power and powe factor. Mention units.

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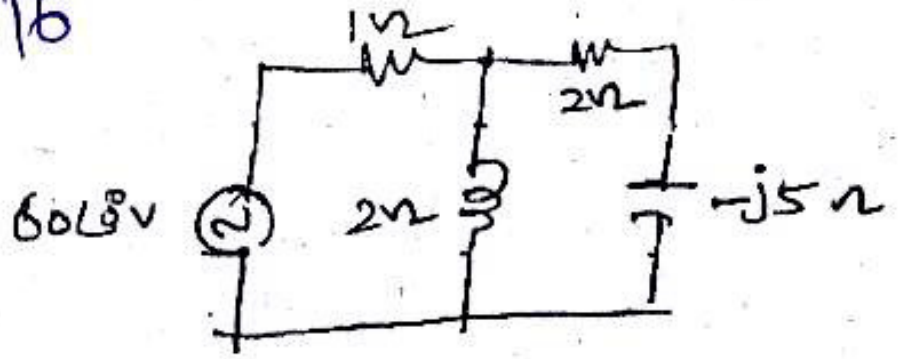
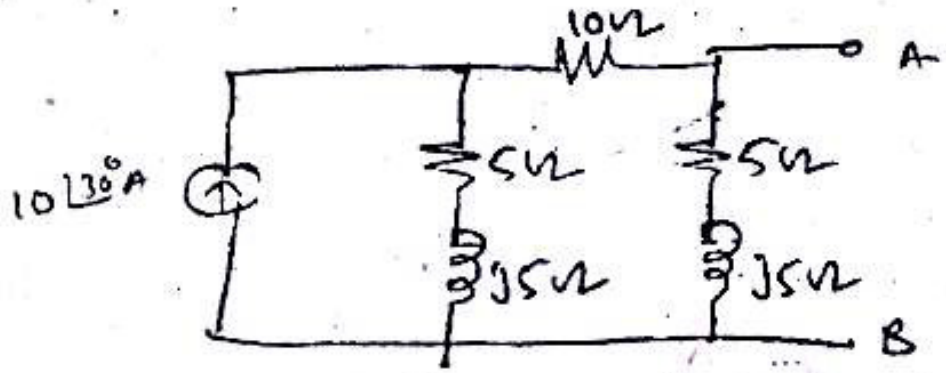
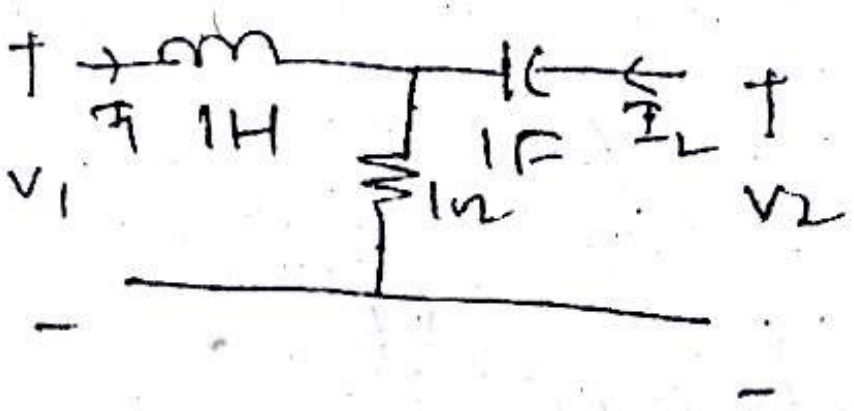


6. (a) Find the maximum power output from the circuit if output terminals are AB.



(b) Design a series RLC circuit that will resonate at 10 kHzs, have a bandwidth of 1 kHz and draw 15.3 w from 200 V generator operating at resonant frequency of the current.

(a) For the below network find (i) Z parameter (ii) Y parameter (iii) parameter. (10)



(b) Derive quality factor, resonant frequency for a series RLC circuit. (4)

(a) Evaluate the convolution of the functions $f_1(t) = u(t)$ and $f_2(t) = e^{-t}\,u(t)$. Also compare the results with inverse transform of $F_1(s)\,F_2(s)$.

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(b) Using the Initial and final value theorem find $f(0^+)$ and $f(\infty)$.

(i) $F(s) = \dfrac{2(s+1)}{s^2 + 2s - 15}$

(ii) $F(s) = \dfrac{s^2 + 2s + 3}{s^3 + 3s^2 + 3s + 1}$.

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EEE

[05 – 2111]

II/IV B.E. DEGREE EXAMINATION.

First Semester

Electronics and Communication Engineering

NETWORK THEORY

(Common with Dual Degree program in EEE)

(Effective from the admitted batch of 2006 – 2007)

Time : Three hours Maximum : 70 marks

Question No. 1 is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

(1)

2015

1. (a) State Norton's theorem.

(b) A voltage wave is represented by $v = 200 \sin 314t$. Find

(5)

(i) Rms value

(ii) Average value

(iii) Instantaneous value after 0.05 sec.

(c) Obtain Laplace transform of $f(t) = 1 - e^{-at}$, 'a' being constant.

(d) Write the expression for resonance frequency of parallel RLC circuit.

(e) Give equation for star to delta to star transformation.

(f) Express ABCD parameter intervals of z-parameter.

(g) Find the Laplace transform $e^{-at}\cos\omega t$.

2. (a) Define and explain Kirchoff's laws with examples.

(b) Find 'i' and 'V_a' in figure 1.

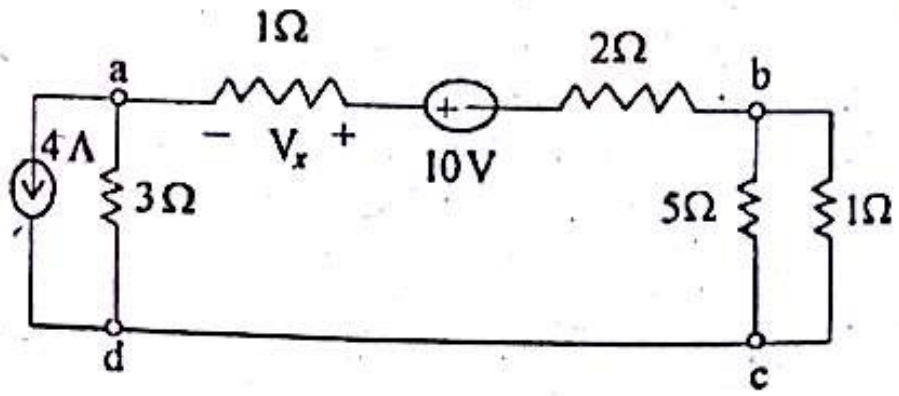

Figure 1

3. (a) State and explain maximum power transfer theorem with suitable example.

(b) Find the current in the 10 Ω resistor in the circuit of figure 2, using Thevinin's theorem. What is the power loss in that resistor?

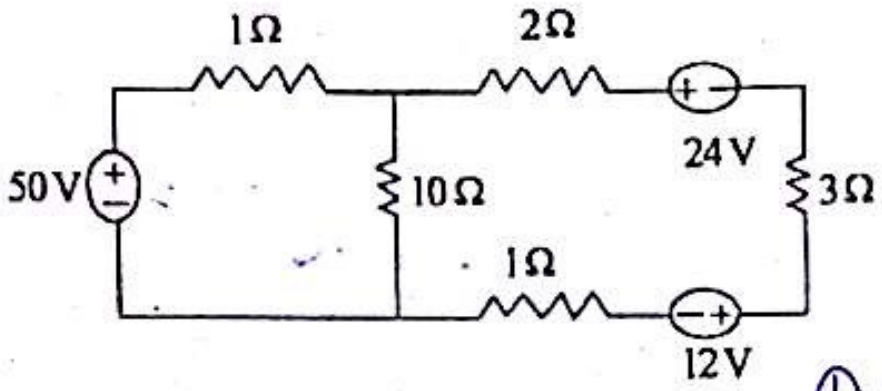

Figure 2

4. (a) A D.C. voltage of 100 V is suddenly applied in the network shown in figure 3, find the transient currents in both the loops and obtain the transient voltage across the capacitor.

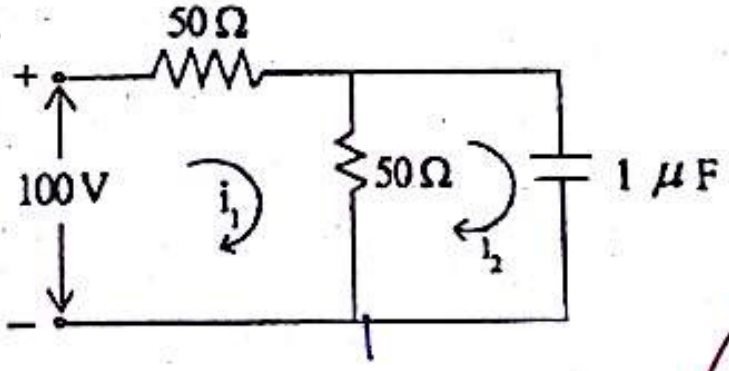

Figure 3

(b) Explain the transient response in series RL circuit.

5. (a) In the circuit shown in figure 4, switch S is closed on position 1 at $t = 0$, at $t = 0.1$ s, the switch is moved to position 2. Obtain the equations for the current in both intervals and draw the current curve. 6

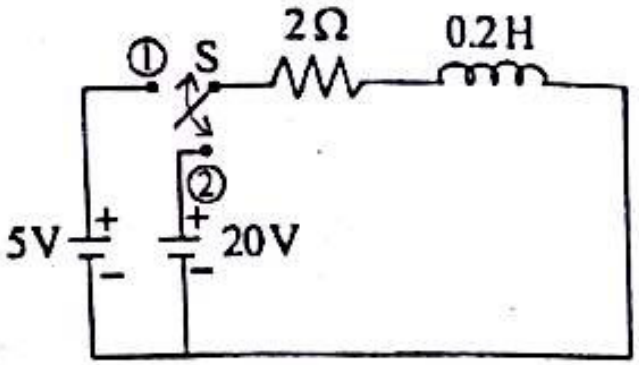

Figure 4

(b) For the circuit shown in figure 5, find the current in $(4 + j2)\Omega$ by superposition principle.

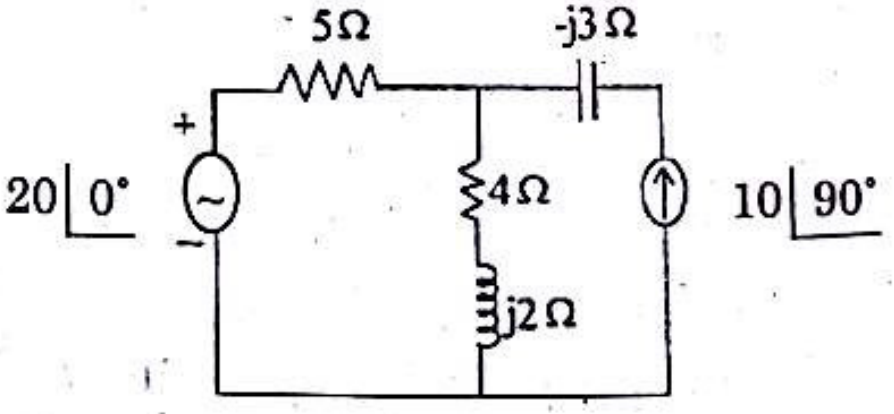

Figure 5

6. (a) A balanced three-phase Δ connected load has per phase impedance of $(15 + j10)\Omega$. If 400 V, three-phase supply is connected to this load find

(i) the phase currents

(ii) line currents

(iii) power supplied by the load.

(b) Explain Bandwidth, Q-factor of series RLC circuit.

7. (a) Determine ABCD parameters for the network shown in figure 6.

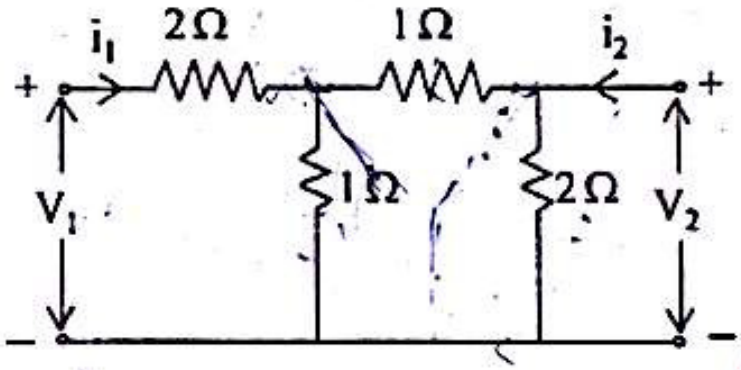

Figure 6

(b) A coil having an inductance of 200 mH is magnetically coupled to another coil having an inductance of 500 mH. The coefficient of coupling between the coils is 0.65.Calculate the equivalent inductance if the coils are connected in

(i) series aiding

(ii) series opposing

(iii) parallel aiding and

(iv) parallel opposing.

8. (a) State and explain initial value and final value theorems.

(b) Determine impulse response of series RC circuits in Laplace domain.
