Name of the Examinations: B.E. COMPUTER SCIENCE AND ENGINEERING

FIRST YEAR SECOND SEMESTER – 2017
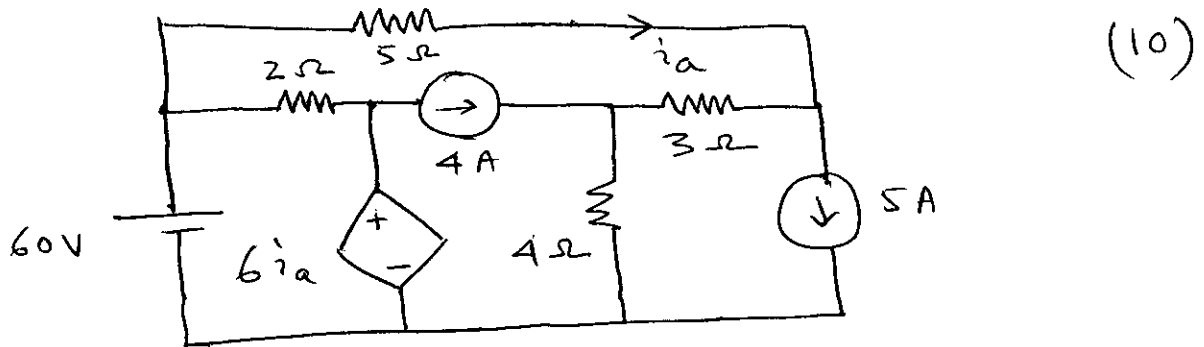
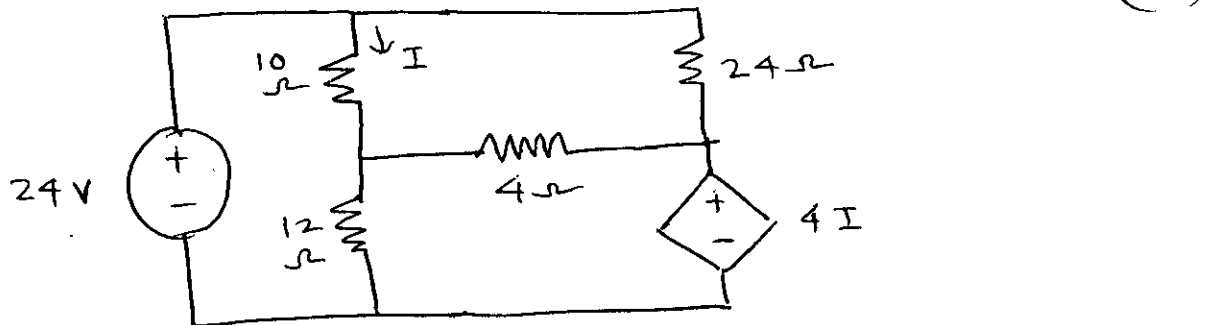Subject: CIRCUIT THEORY   Time: 3 Hours   Full Marks : 100
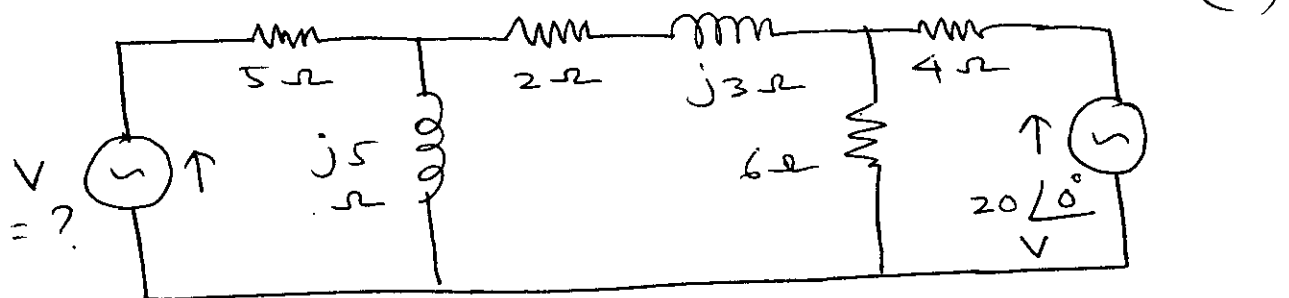
Answer any 5 questions

1. (a) Use Superposition Theorem to find the value of the dependent voltage source in the given circuit.
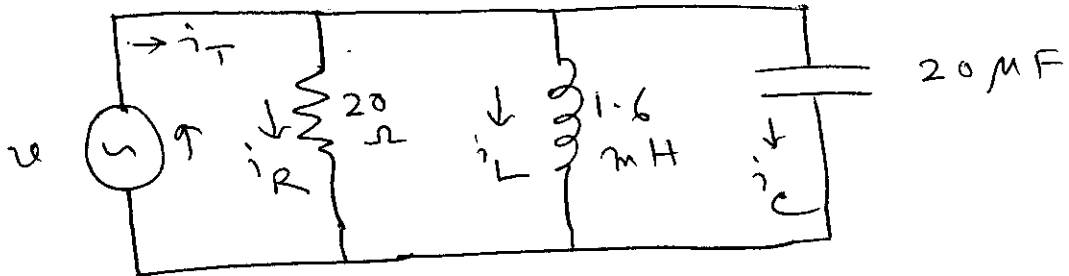
(10)

1.(b) Use mesh analysis and Cramer's rule to find the current I in the circuit.
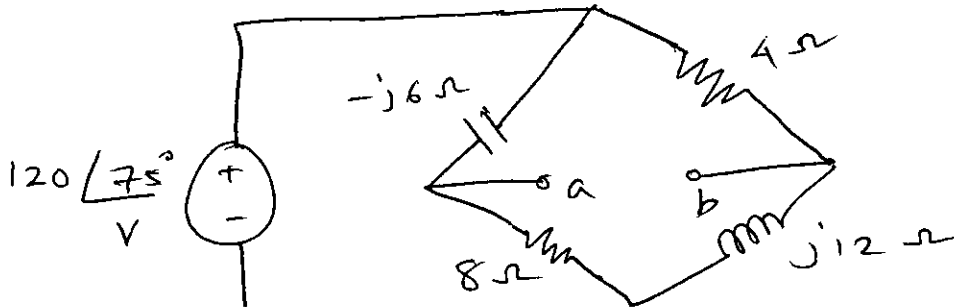
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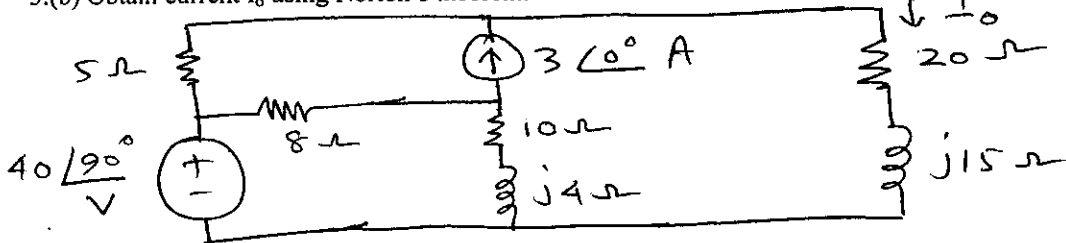2.(a) In the given network, find the source voltage for which the current in the 26 ∠6° V source is zero.

(10)

2.(b) Given $v = 50 \sin(5000t + 45°) \ V$, find i_R, i_L, i_C and i_T. Also, draw the phasor diagram for the currents.
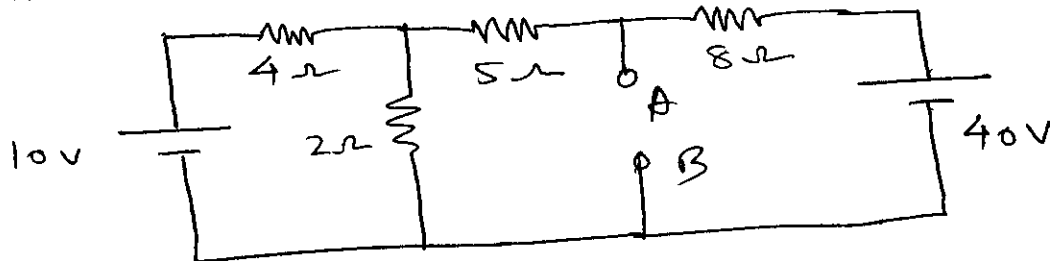
(10)

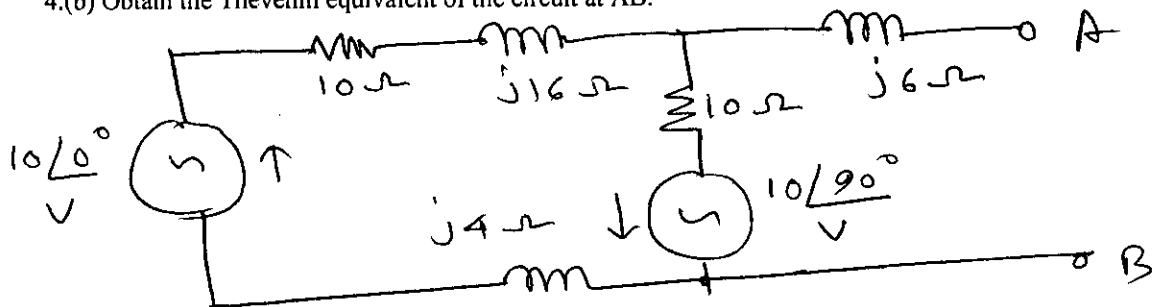3.(a) Obtain the Thevenin equivalent at terminals a – b.

(10)

3.(b) Obtain current I_o using Norton's theorem.

(10)

4.(a) Find the Thevenin and Norton equivalent circuits across AB.

(10)

4.(b) Obtain the Thevenin equivalent of the circuit at AB.

(1(

2

5.(a) What is the function of a filter in an audio amplifier? Describe the characteristics of i)high-pass; ii)low-pass and iii)band-pass filter with suitable graphs. Draw only practical curves and not ideal ones. What is roll-off rate of a filter? What is meant by x dB/octave rate? (10)

5.(b) Select a suitable value for the resistance, R of an RC filter (C = 1   ), such that it will filter out any noise above 10 Hz. It will pass the electric signals at about 1 Hz. If an input voltage of 1 volt is considered, find the outputs at 1 Hz, 10 Hz and 40 Hz. (10)
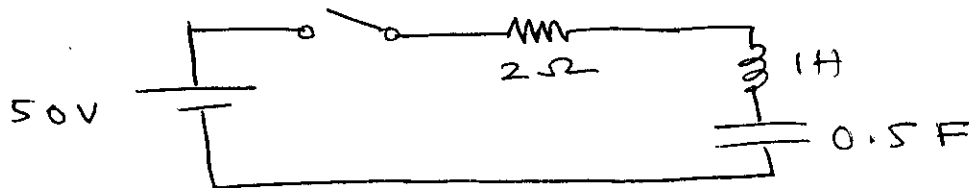
6.(a) Find the resonant frequency of the network. (10)

$2\,\Omega$ $5\,\Omega$ $1\,\Omega$ $1\,mF$ $0.1\,H$
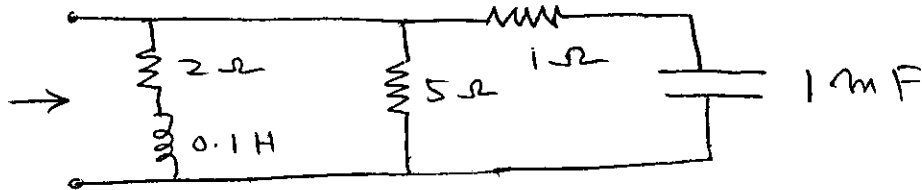
6.(b) For the network shown, find (i) the resonant frequency and (ii) the impedance Z_{in} (at jw_o). (10)

Z_{in} $5\,\Omega$ $10\,mF$ $2\,\Omega$ $5\,\Omega$ $10\,mH$
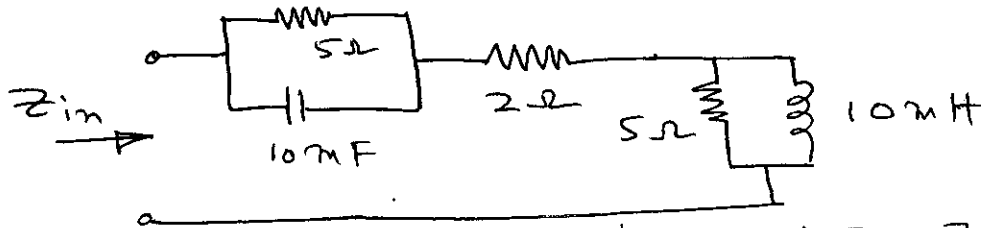
7.(a) Find the Laplace transforms of (i) $f(t) = e^{at}$ (ii) $\frac{d}{dt}\left[f(t)\right]$
(iii) $\int_0^t f(t)\,dt$

7.(b) Find i(t) by Laplace Transform. The capacitor and inductor are discharged at t = 0. (10)

$50\,V$ $2\,\Omega$ $1\,H$ $0.5\,F$

8.(a) Define even and odd functions mathematically and explain by graphs. Find the even and odd functions out of the following. (i) f(x)=tan x; (ii) f(x) = x+x³+x⁷; (iii) f(x) = cos x (10)

8.(b) Find the Trigonometric Fourier series for the waveform. (10)

$f(t)$

+ V

0   π 2π 3π ωt

− V

3