

**BACHELOR OF ENGINEERING IN COMPUTER SCIENCE &
ENGINEERING EXAMINATION, 2018**

(1st Year, 2nd Semester)

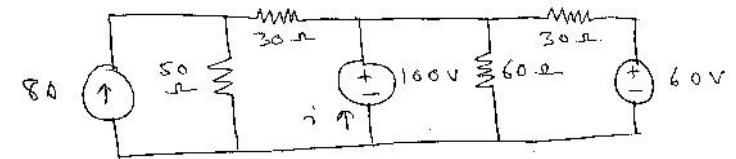
CIRCUIT THEORY

Time : Three hours

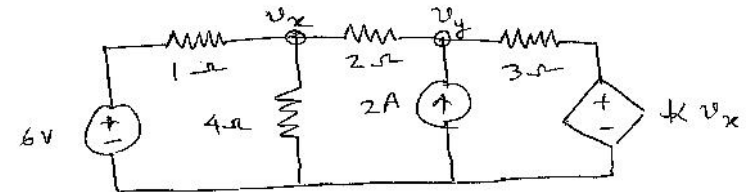
Full Marks : 100

Attempt *any five* questions.

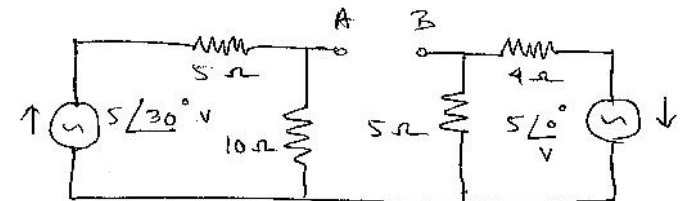
1. a) Apply super position theorem to find 'i' in the given circuit. 10



- b) Use nodal analysis to find the value of K so that v_y is zero. 10



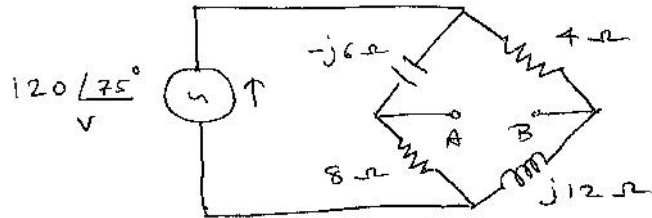
2. a) Find the Thevenin equivalent circuit across AB. 10



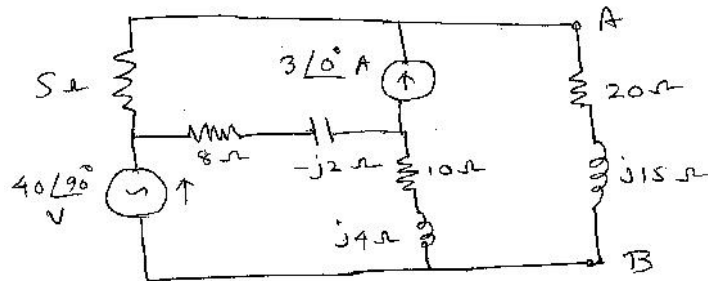
[Turn over

[2]

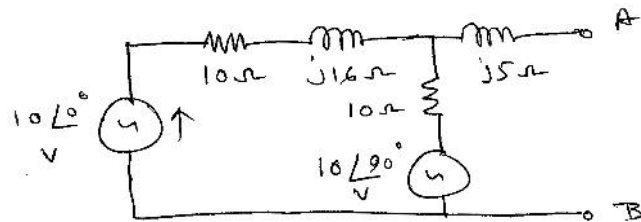
b) Find out the Thevenin equivalent across AB. 10



3. a) Obtain current I_0 in the circuit using Norton's theorem. 10

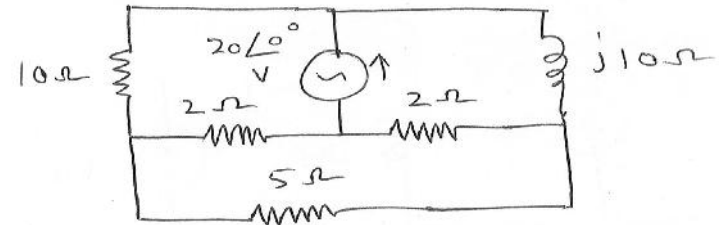


b) Find the Norton's equivalent circuit at AB. 10

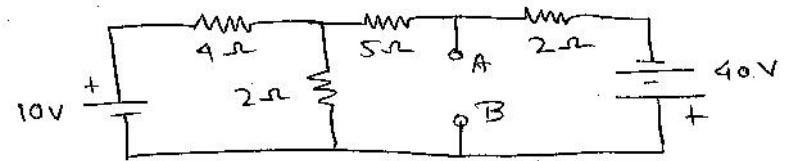


[5]

8. (a) Find out the current flowing through the 5Ω resistance. 10



(b) Find out the Thevenin and Norton's equivalents at AB. 10



[4]

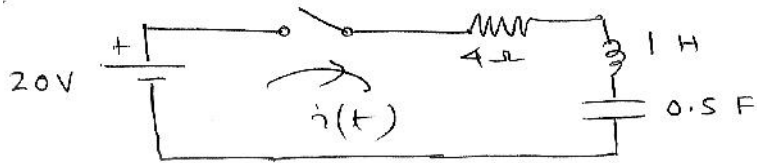
b) For a RC filter circuit, $c=1 \mu\text{F}$. It filters out any raise above $Z_0\text{Hz}$ and pass the signals at 10 Hz . For an input voltage of 1V , find the output voltages at 10Hz , 20Hz and 40Hz .

6. a) Find out the laplace Transforms of “

i) $f(t) = e^{at}$

ii) $\int_0^t f(t) \cdot dt$

b) Find out $i(t)$ in the circuit. 10



Capacitor & inductor have no initial charge.

7. (a) Find out whether the given functions are odd or even. 10

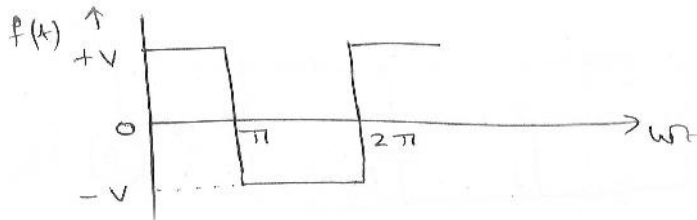
(i) $f(x) = \cos x$

(ii) $f(x) = 2+x^3+x^4$

(iii) $f(x) = x+x^3+x^5+x^7$

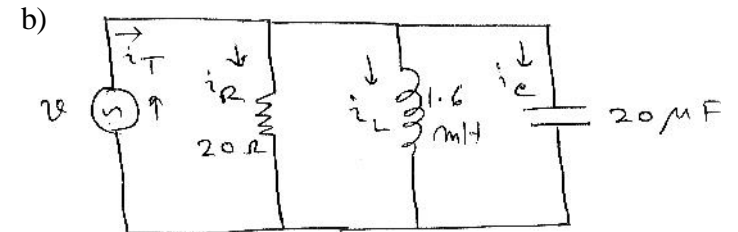
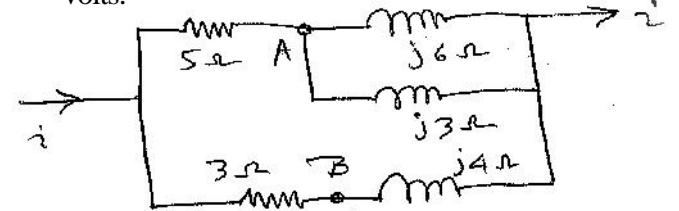
(iv) $f(x) = \tan x$

(b) Find out the trigonometric Fourier series for the waveform. 10



[3]

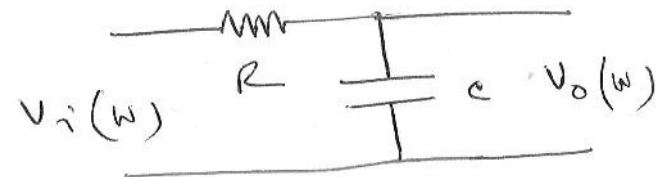
4. a) Find out V_{AB} . Given that the voltage across 5Ω is 45 volts . 10



$v = 50 \sin(5000t + 45^\circ)$ volts. Find i_T , i_R , i_L , & i_C draw the phasor diagrams for the different currents. 10

5. a) Prove that for the given passive lowpass filter circuit,

$$\omega_c = \frac{1}{RC} \quad 10$$



[Turn over