

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: EC201

Course Name: NETWORK THEORY

Max. Marks: 100

Duration: 3 Hours

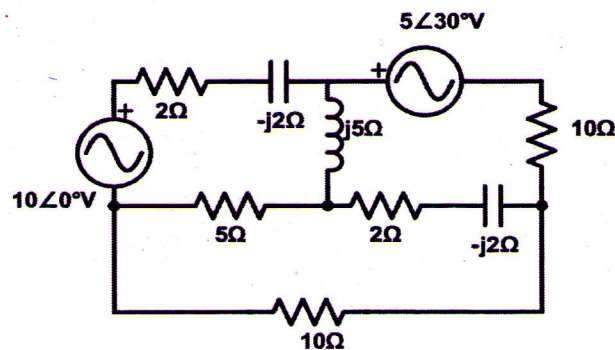
## PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Find the voltage across  $10\Omega$  resistor using mesh analysis.

(8)

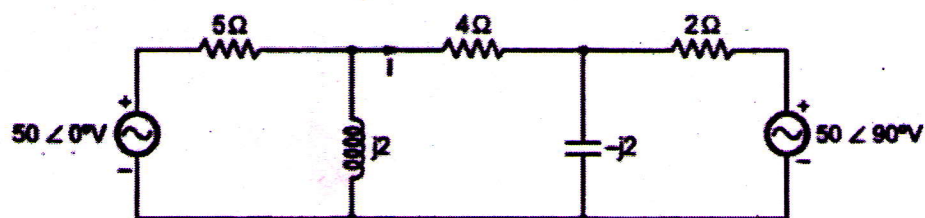


- b) State and prove the following properties of Laplace transform i) Time Shifting ii) Frequency Shifting

(7)

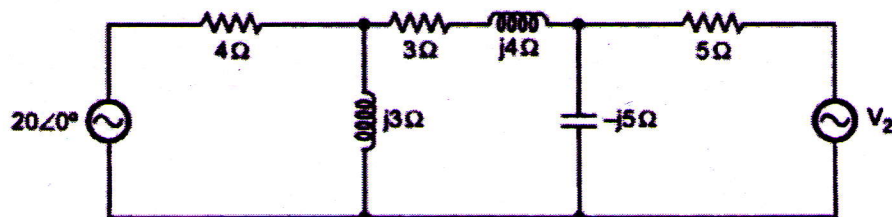
- 2 a) Find current  $I$  using node analysis.

(8)

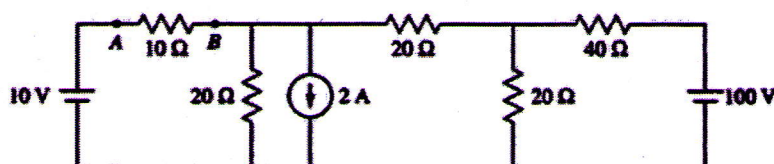


- b) Determine the value of  $V_2$  such that the current through the impedance  $(3+j4)\Omega$  is zero.

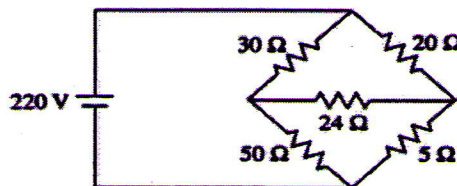
(7)



- 3 a) Determine the voltage across  $10\Omega$ , connected between the terminals A and B, using superposition theorem. (9)



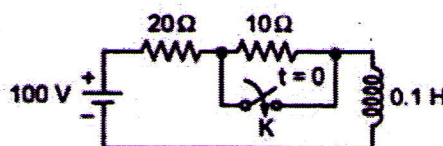
- b) Using Thevenin's theorem, find the power dissipated across  $24\Omega$  resistor. (6)



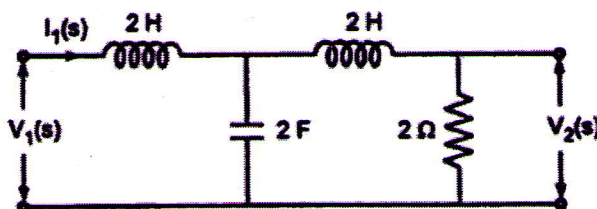
### PART B

*Answer any two full questions, each carries 15 marks.*

- 4 a) Obtain the transient current and voltage responses of a RL circuit when subjected to a unit step input. (6)
- b) Solve the differential equation  $\frac{d^2 v(t)}{dt^2} + 6 \frac{dv(t)}{dt} + 8v(t) = 2u(t)$  subject to the initial conditions  $v(0) = 1, v'(0) = -2$ . (9)
- 5 a) For the given network function, draw the pole-zero plot and hence, obtain its time domain response from the plot.  $V(s) = \frac{5(s+5)}{(s+2)(s+7)}$  (8)
- b) A dc voltage of 100V is applied in the circuit shown in the figure and the switch, K is kept open. The switch is closed at  $t=0$ . Find the resulting current. (7)



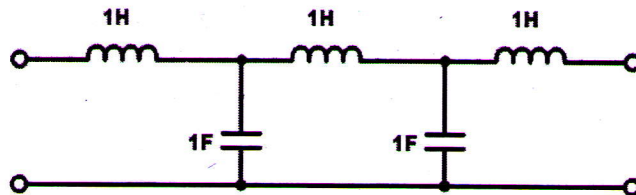
- 6 a) Write down the necessary conditions for driving point functions. (6)
- b) For the network shown, find the following  $\frac{I_2(s)}{I_1(s)}, \frac{V_2(s)}{V_1(s)}$  and  $\frac{V_1(s)}{I_1(s)}$ . (9)



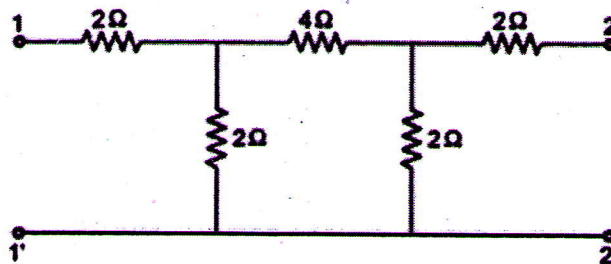
## PART C

Answer any two full questions, each carries 20 marks.

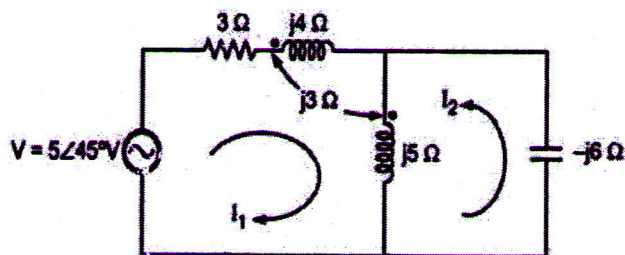
- 7 a) Show that the overall Y parameter, of two 2-port networks when connected in parallel, is the sum of individual Y parameters of the two networks. (6)
- b) Determine the transmission parameters of the two port network given below. (9)



- c) Define the terms (i) Characteristic impedance (ii) Propagation Constant (5)
- 8 a) A series RLC circuit resonates at a frequency of 1500Hz and consumes 75W power for 50V ac source at resonant frequency. The bandwidth is 0.75kHz. Calculate R, L and C. Also calculate the maximum current and half power frequencies. (10)
- b) Obtain the open circuit Z parameters of the network shown in figure. (10)



- 9 a) Derive the expressions for (i) maximum output voltage and (ii) maximum amplification factor for a single tuned circuit. (12)
- b) Find the drop across the capacitor. (8)



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