Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

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

Course Code: EC201

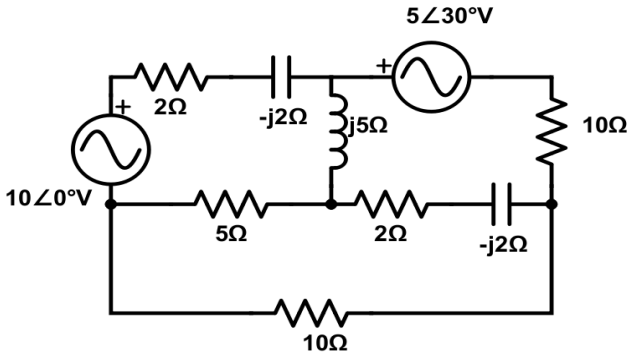
Course Name: NETWORK THEORY

Max. Marks: 100 Duration: 3 Hours

PART A

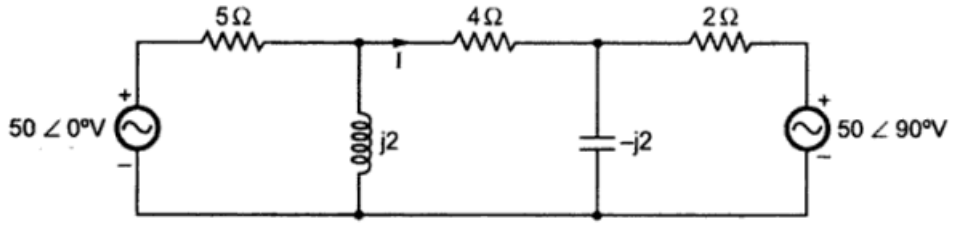
Answer any two full questions, each carries 15 marks. Marks

1 a) Find the voltage across 10Ω resistor using mesh analysis. (8)

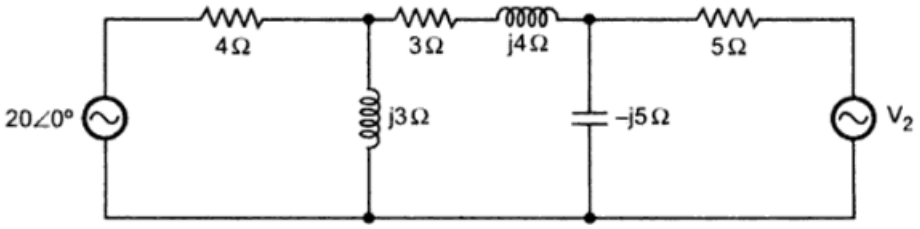


b) State and prove the following properties of Laplace transform i) Time Shifting ii) Frequency Shifting (7)

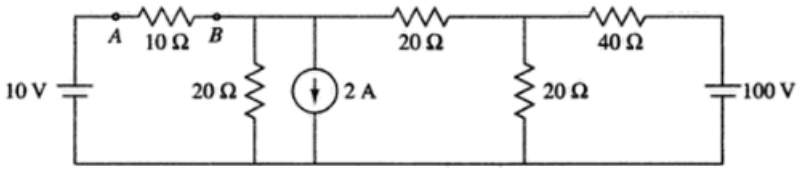
2 a) Find current I using node analysis. (8)



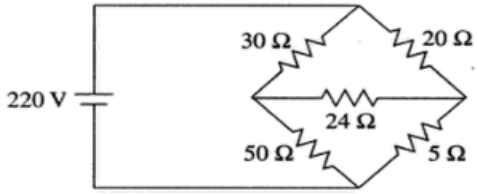
b) Determine the value of V_2 such that the current through the impedance (3+j4)Ω is zero. (7)



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



b) Using Thevenin's theorem, find the power dissipated across 24Ω resistor. (6)



PART B

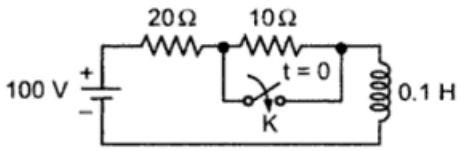
Answer any two full questions, each carries 15 marks.

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 $\frac{d^2v(t)}{dt^2} + 6\frac{dv(t)}{dt} + 8v(t) = 2u(t)$ subject to the initial conditions $v(0) = 1, v'(0) = -2$. (9)

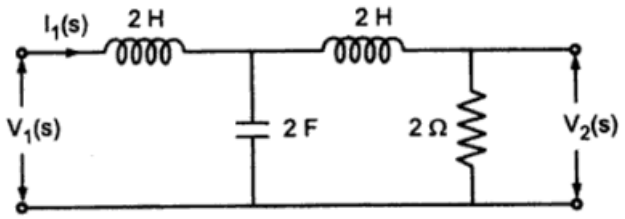
5 a) For the given network function, draw the pole-zero plot and hence, obtain its time domain response from the plot. $V(s) = \frac{5(s+5)}{(s+2)(s+7)}$ (8)

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)

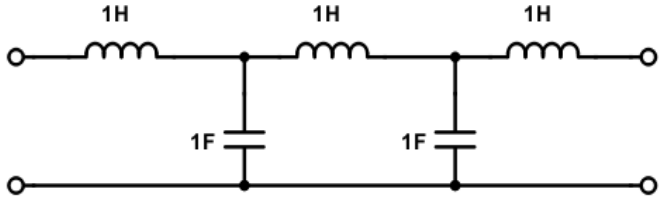


PART C

Answer any two full questions, each carries20 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)

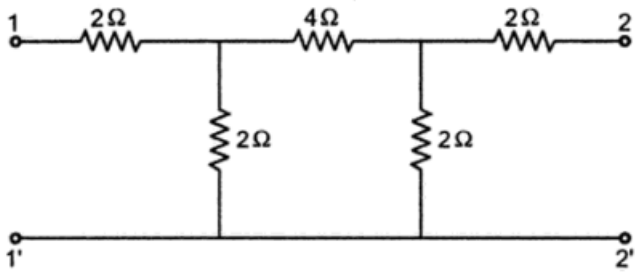
b) Determine the transmission parameters of the two port network given below. (9)



c) Define the terms (i) Characteristic impedance (ii) Propagation Constant (5)

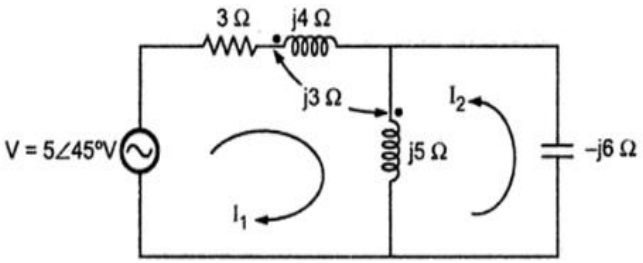
8 a) A series RLC circuit resonates at a frequency of 1500Hz and consumes 75W power for 50V ac source at resonant frequency. The bandwidth is 0.75kHz. Calculate R, L and C. Also calculate the maximum current and half power frequencies. (10)

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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