

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017**

**Course Code: EC201**

**Course Name: NETWORK THEORY (EC, AE)**

Max. Marks: 100

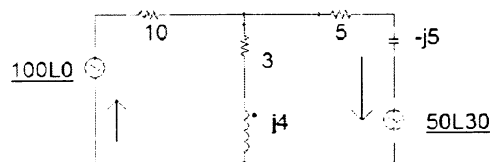
Duration: 3 Hours

**PART A**

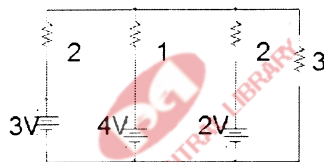
*Answer any two full questions, each carries 15 marks.*

Marks

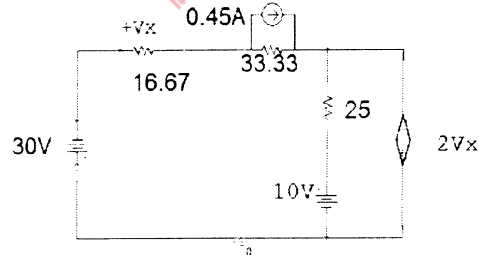
- 1 a) State and prove final value theorem and initial value theorems. (7)  
 b) Find the current in each resistor using the superposition theorem. (8)



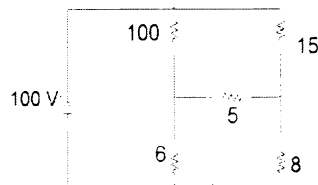
- 2 a) For the circuit shown in figure, find the current through 3 Ω using Millmann's theorem (5)



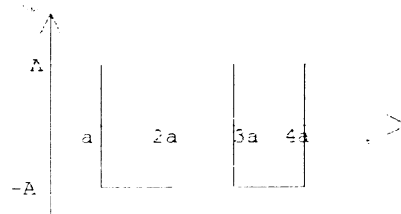
- b) Use mesh analysis to find  $V_x$  in the circuit shown in figure (10)



- 3 a) Use Thevenin's theorem to find the current through 5Ω resistor (10)



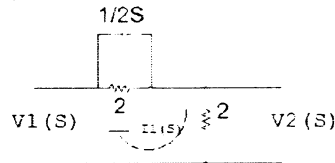
- b) Find the Laplace transform of the square wave shown in figure (5)



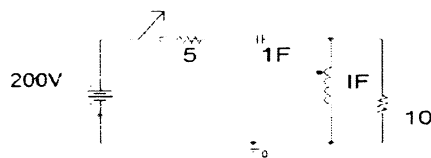
**PART B**

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

- 4 a) For the network shown in fig obtain the transfer functions  $G_{21}(S)$ ,  $Z_{21}(S)$  and driving point impedance  $Z_{11}(S)$ . (10)



- b) Determine the transform impedance and admittance across capacitor (5)  
 5 a) For the circuit shown in figure, the switch was closed at time  $t=0$ , find the drop across  $10\Omega$  (8)



- b) Derive the response of a series RLC circuit with step input. (7)  
 6 a) For the given network function, draw the pole zero diagram and hence obtain the time domain response  $i(t)$ . (10)

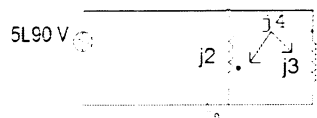
$$I(S) = \frac{5s}{(s+1)(s^2+4s+8)}$$

- b) Find the inverse Laplace transform of  $F(s) = \frac{15s^2 - 15s - 11}{(s+1)(s-2)^3}$  (5)

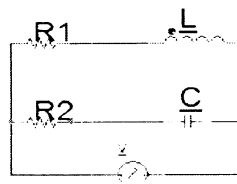
**PART C**

*Answer any two full questions, each carries 20 marks.*

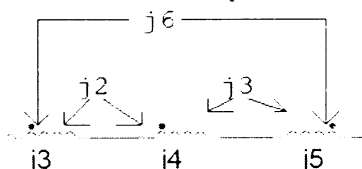
- 7 a) For the circuit shown below find the input impedance and also find the loop currents. (8)



- b) Define the terms Characteristic impedance, Image impedance and propagation constant (5)  
 c) Find the expression for resonant frequency for the circuit shown below. (7)



- 8 a) For the circuit shown below determine the equivalent reactance (5)

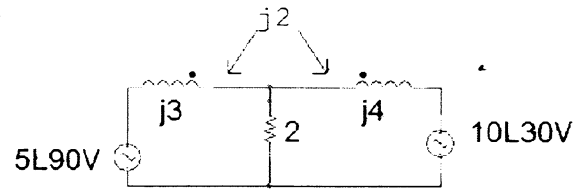


- b) Prove that  $AD-BC=1$  for a two port bilateral network (7)

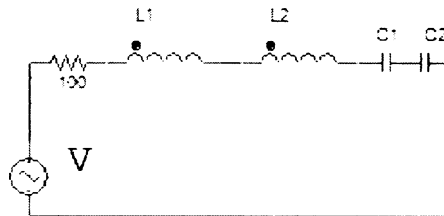
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- c) For the circuit shown in figure find the drop across the two inductor coils. (8)



- 9 a) A capacitor of  $30\mu F$  and a resistance of  $40\Omega$  are connected in series with a coil (10)  
having resistance  $5$  and inductance  $L$ . The circuit resonates at  $1.5KHz$  frequency.  
Find the value of  $L$ . Also find the current at resonance,  $Q$  factor, half power  
frequencies and bandwidth.
- b) For the circuit shown in figure find the expression for frequency at resonance. (10)



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