

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: EC201

Course Name: NETWORK THEORY (EC, AE)

Max. Marks: 100

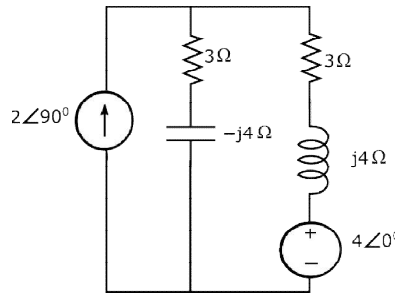
Duration: 3 Hours

PART A

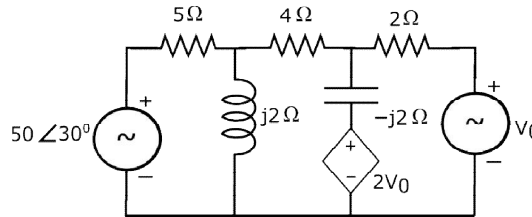
Answer any two full questions, each carries 15 marks

Marks

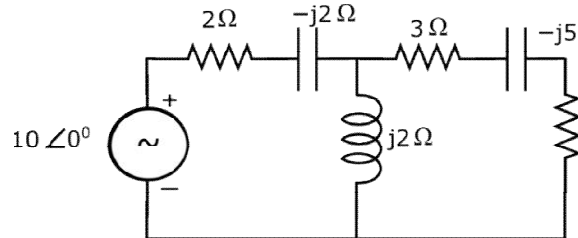
- 1 a) State Thevenin's Theorem & Reciprocity Theorem. (4)
 b) Using Superposition Theorem, find the value of current through the capacitor. (4)



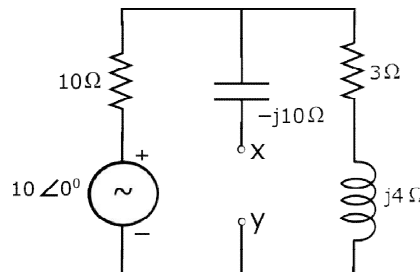
- c) Find the value of V_0 such that no current flows through 4Ω resistor. (7)



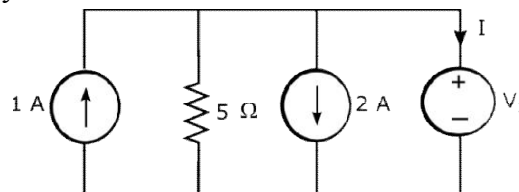
- 2 a) Find the voltage across inductor. Also find the power dissipated across 2Ω resistor. (8)



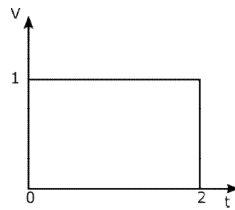
- b) Obtain Thevenin equivalent circuit across x-y. Then obtain Norton equivalent circuit. (7)



- 3 a) The power supplied by 1A source is 10W. Find V_1 and I. (6)



- b) Find Laplace transform of the following: (9)
- i) $\sin(5t) \cdot \cos(2t)$
 - ii) $te^{-2t} \cos(t)$
 - iii)



PART B

Answer any two full questions, each carries 15 marks

- 4 a) Solve the differential equation using Laplace Transform, given $y(0) = 1$ and $y'(0) = 0$. (8)

$$y'' - y' - 2y = t$$

- b) The current $I(s)$ of a network is (7)

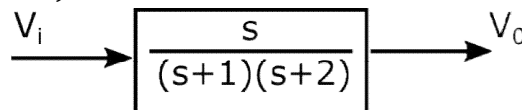
$$I(s) = \frac{10s}{(s+1)(s+3)}$$

Plot its pole-zero plot and hence obtain $i(t)$ from the pole-zero plot.

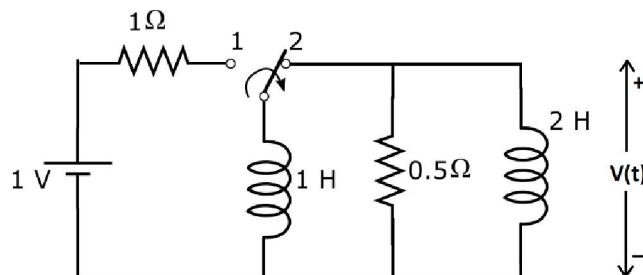
- 5 a) Write any five properties of driving point immittance functions. (5)

- b) Find the steady state output voltage $V_0(t)$, given the input voltage (3)

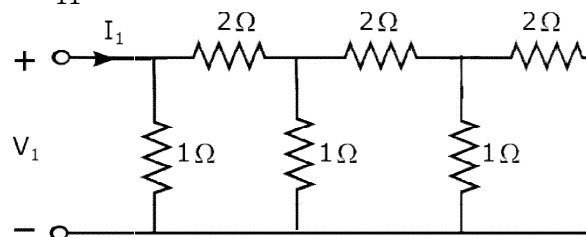
$$V_i(t) = 10 \cos(2t + 40^\circ) \text{ V}$$



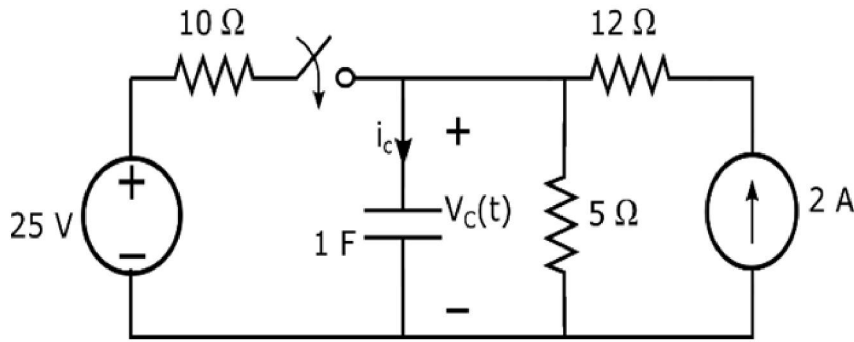
- c) The switch is in position 1 for a long time. At $t = 0$, it is moved to position 2. Find $v(t)$ for $t \geq 0$. (7)



- 6 a) Find I_2/I_1 and Z_{11} for the below network. (7)



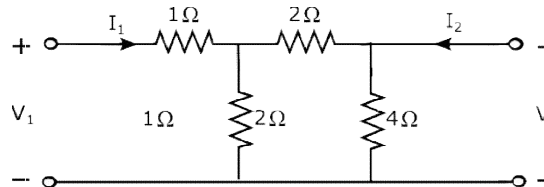
- b) The switch is opened for a long time. The switch is closed for $t \geq 0$. Find the expression of capacitor voltage $V_c(t)$ for $t \geq 0$. Then determine capacitor current i_c . (8)



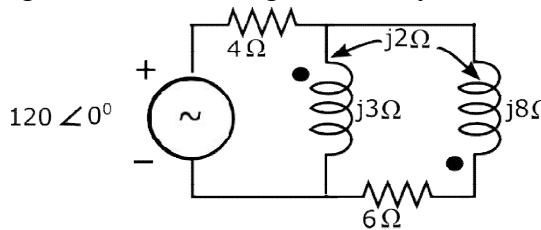
PART C

Answer any two full questions, each carries 20 marks

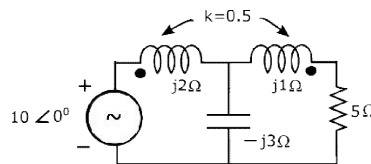
- 7 a) Differentiate between self-inductance and mutual inductance. (2)
- b) Give the expressions of quality factor of series and parallel RLC networks. (3)
- c) Find the ABCD parameters of the network shown. (7)



- d) Find the current through 6Ω resistor using mesh analysis. (8)



- 8 a) Explain the term selectivity. (2)
- b) Draw the series and parallel connection of two port network and derive the parameter matrices for the resultant network. (8)
- c) Draw the circuit of a single tuned circuit and derive an expression for output voltage. (10)
- 9 a) Explain the following terms and write the relation between them: (4)
 - i) Bandwidth
 - ii) Q factor.
- b) Find the drop across 5 Ω resistor. (6)



- c) Currents I_1 and I_2 entering at port 1 and port 2 respectively of a two-port network are given by (10)

$$I_1 = 0.5V_1 - 0.2V_2$$

$$I_2 = -0.2V_1 + V_2$$

Find Y, Z and ABCD parameters. From Y parameters, check whether the network is reciprocal and symmetrical.
