Reg No.:_____ Name:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) / S1 (PT) (S,FE) Examination June 2024 (2015 Scheme)

Course Code: EC201

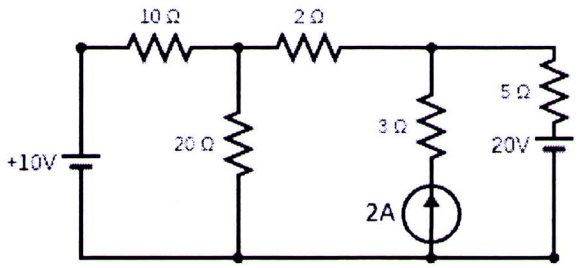
Course Name: NETWORK THEORY

Max. Marks: 100 Duration: 3 Hours

PART A

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

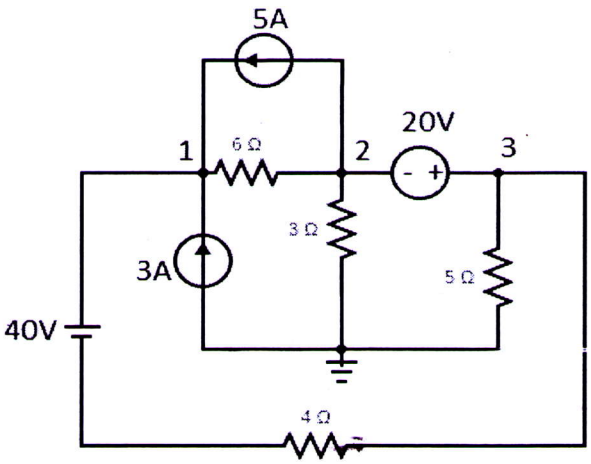
1 a) (10)



Determine the voltage across 2 Ω resistor using super-position theorem.

b) Illustrate the concept of source transformation with necessary sketches. (5)

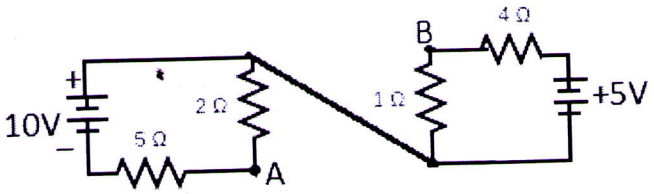
2 a) (10)



Determine the power dissipated by the 5 Ω resistor in the circuit.

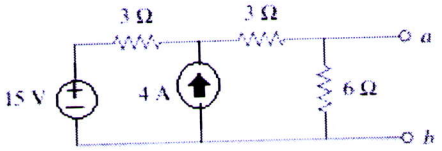
b) State and prove maximum power transfer theorem (5)

3 a) (8)



Determine the Thevnin's equivalent circuit across terminals AB for the given circuit.

b) (7)



Using Norton's theorem, find R_N and I_N of the circuit across terminals a-b.

PART B

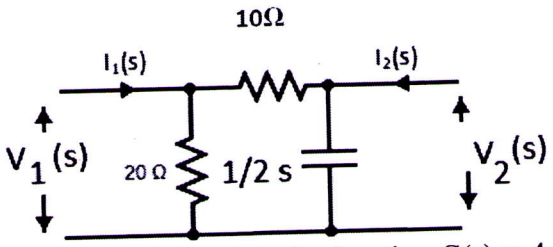
Answer any two full questions, each carries 15 marks.

4 a) Determine the inverse Laplace transform of the function $G(s) = \frac{7}{(S^2+3)} + \frac{8}{(S+5)}$ (6)

b) Derive the response of a series RC circuit for a step input (6)

c) Define poles and zeros of a transfer function (3)

5 a) Determine the transfer function $G_{21}(s)$, $Z_{21}(s)$ and driving point impedance $Z_{11}(s)$ of the given network (10)



b) Draw the pole zero diagram for the transfer function G(s) = 4s(s+2)/ (s+1) (s+3) and also calculate g (t). (5)

6 a) Determine the solution of the following differential equation using Laplace transform method. (15)

$2y'' + 3y' - 2y = 2\,te^{-2t}$

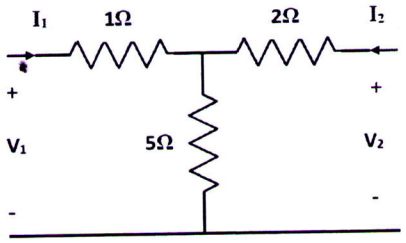
$y(0) = 0$ and $y'(0) = -2$

PART C

Answer any two full questions, each carries 20 marks.

7 a) A series RLC circuit has the following parameter values R=10Ω L=0.01H C=100μF. Compute the resonant frequency, lower and upper frequencies of the bandwidth. (8)

b) Find the transmission parameter for the network shown below (8)



c) Obtain the condition for symmetry in two port networks. (4)

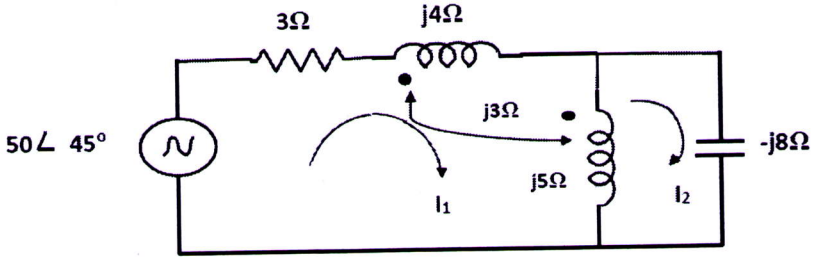
8 a) Express Z-parameter in terms of Y parameter and hybrid parameters (8)

b) Compare series and parallel resonant circuit in terms of following parameters (8)
(i)current at resonance (ii)impedance at resonance (iii)Power factor (iv)Quality factor

c) A coil of 20Ω resistance has an inductance of 0.2 H and is connected in parallel with a condenser of 100μF capacitance. Find the value of dynamic resistance. (4)

9 a) Derive the expression for resonant frequency of a parallel RLC circuit. (8)

b) Find the current through the capacitor in the given figure using mesh analysis. (12)



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