Reg No.:_____ Name:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree (S,FE) Examination January 2022 (2015 Scheme)

Course Code: EC201

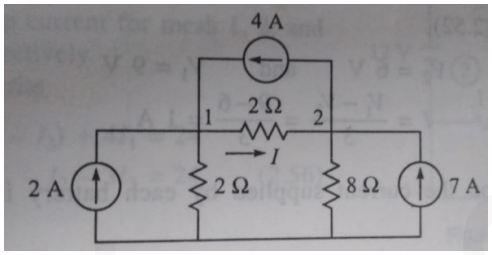
Course Name: NETWORK THEORY

Max. Marks: 100 Duration: 3 Hours

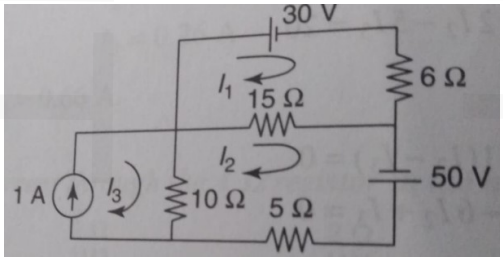
PART A

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

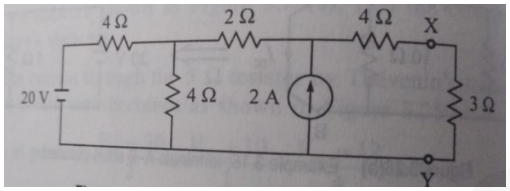
1 a) Using nodal analysis ,find I in the circuit shown below (7)



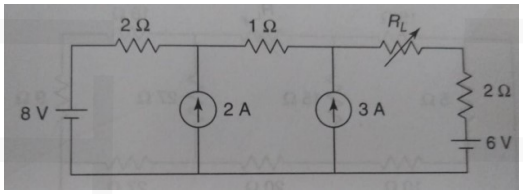
b) Determine the mesh currents I_1,I_2 and I_3 in the circuit given (8)



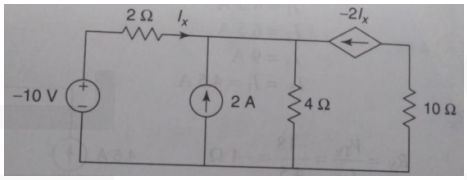
2 a) Determine the current through 3Ω for the circuit shown using Norton's theorem (8)



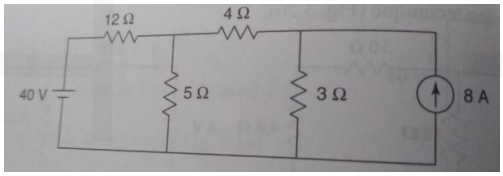
b) For the network shown,find the value of the resistance R_L for maximum power transfer and calculate the maximum power. (7)



3 a) Determine current through 2Ω resistor in the network shown in figure (8)



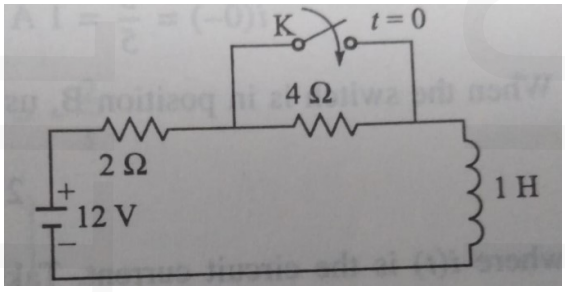
b) Find current flowing through 4Ω resistor (7)



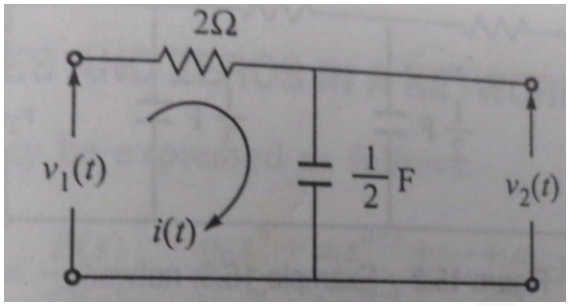
PART B

Answer any two full questions, each carries 15 marks.

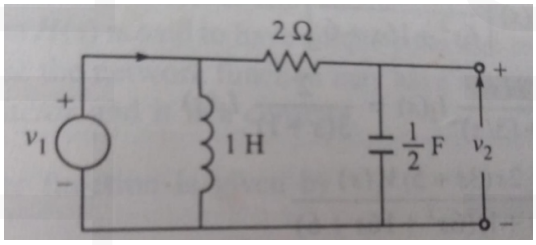
4 a) A dc voltage is given to the circuit keeping the switch open so that steady state is reached. Determine the complete response for the circuit after closing the switch. (8)



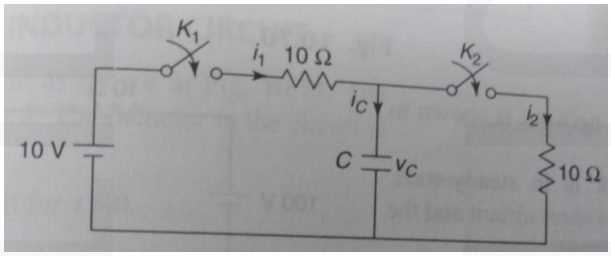
b) Calculate the voltage transfer ratio $V_1(s)/V_2(s)$ for the network shown below (7)



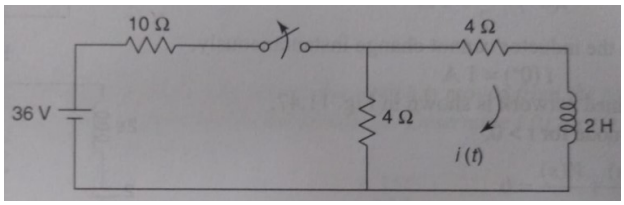
5 a) Determine the current transfer ratio $\alpha_{12}(s)$ and transfer impedance $Z_{21}(s)$ (8)



b) In the circuit shown,switch K1 has been closed for a long time prior to t=0.At t=0, the switch K2 is also closed. Find$v_c(o+)$ and $i_c(0+)$ (7)



6 a) The circuit has acquired steady state with switch closed for t<0.At t=0,the switch is opened .Find i(t) for t>0 (8)



b) Show the pole zero plot for the given network function V(s) and obtain v(t) (7)

$$V(s) = \frac{10s}{(s+3)(s+2)}$$

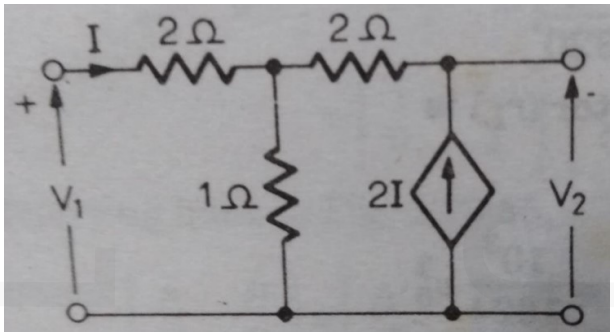
PART C

Answer any two full questions, each carries20 marks.

7 a) The Z parameters of a circuit is given below. Obtain its transmission parameters (10)

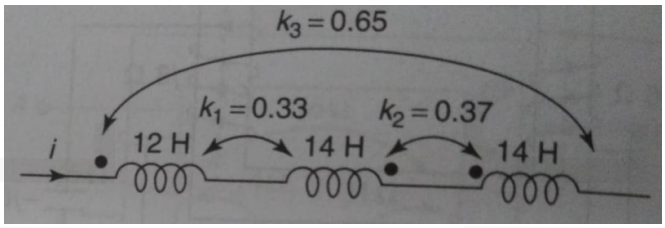
$$\begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}$$

b) Obtain open circuit parameters for the network shown (10)

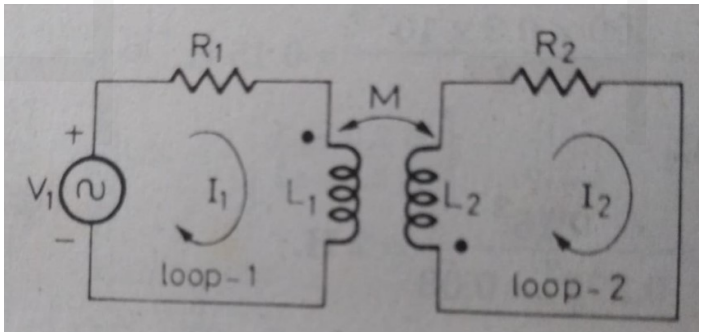


8 a) Derive the expression for half power frequencies in series RLC resonant circuits (10)

b) Find the equivalent inductance of the network shown (4)



c) Write the mesh equations for the transforner circuit shown (6)



9 a) Currents entering port1 and port2 of a two port network are given by the following equations (10)

$I_1 = 0.5V_1 - 0.2\,V_2$

$I_2 = -0.2V_1 + V_2$

Find Z and ABCD parameters

b) A non inductive resistor of 12Ω, an inductor of 0.2H and a capacitor of 9μF are connected in series. Calculate (i) the resonance frequency (ii) current at resonant frequency (iii) the voltage across each component when a voltage of 35V at resonant frequency is applied to the whole circuit. (10)

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