Total No. of Printed Pages:05

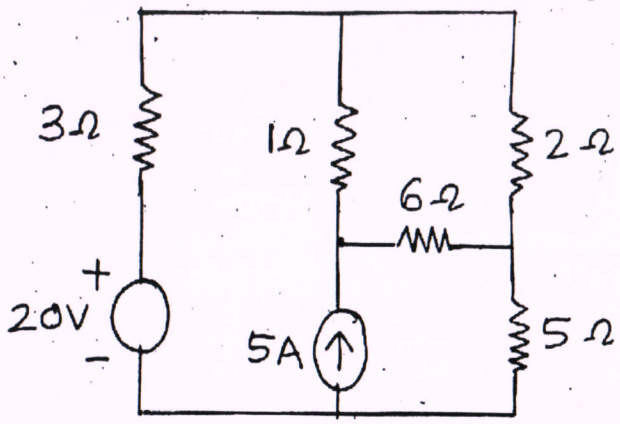
S.E.(Electronics & TC)/Electronics &Comm Engg) (Semester- III) (Revised Course 2007-08)
EXAMINATION MAY/JUNE 2019
Network Analysis & Synthesis

[Duration : Three Hours] **[Total Marks : 100]**

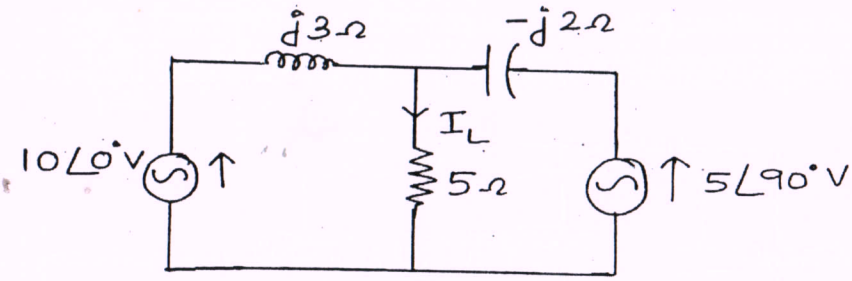
Instructions:-
Please check whether you have got the right question paper.
1) Attempt any five questions, choosing atleast one from each Module.
2) Assume suitable data, if necessary.
3) Draw neat sketches, wherever required.

MODULE-I

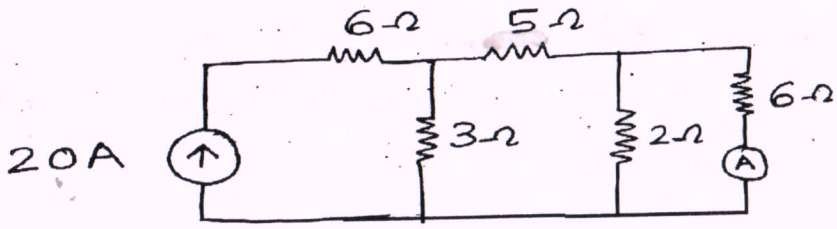
Q.1 a) Using nodal analysis, find the power dissipated in the 6Ω resistor for the circuit shown. **06**



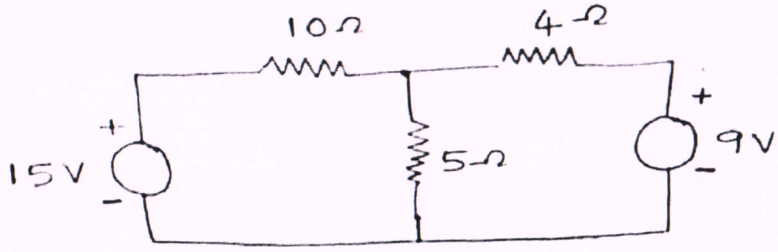
b) For the circuit shown, determine the load current I_L, by using Norton's theorem. **06**



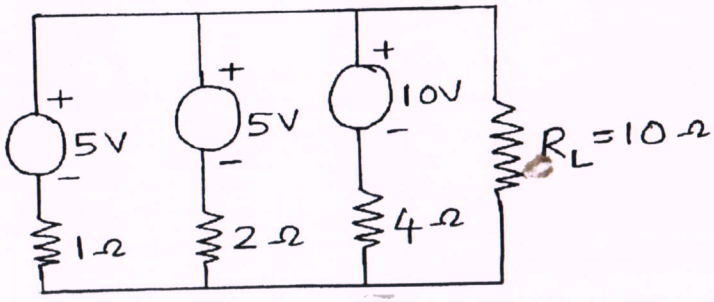
c) State the compensation theorem. Using the compensation theorem, determine the ammeter reading where it is connected to the 6Ω resistor as shown in the circuit. The internal resistance of the ammeter is 2Ω. **08**



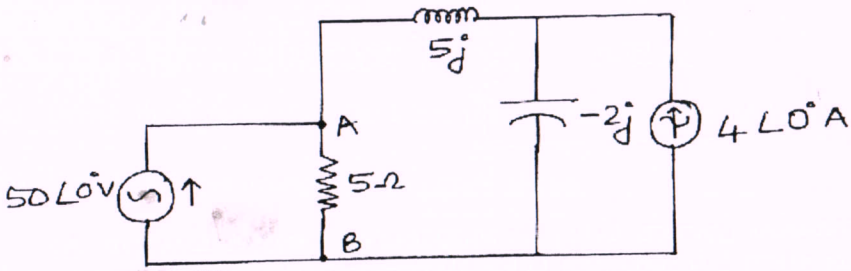
Q.2 a) Apply Thevenin's theorem to find current through 4Ω resistor for the circuit shown. **05**



b) For the circuit shown, find the current through R_L using Millman's theorem. **05**



c) For the circuit shown, determine the voltage V_{AB} using the superposition theorem. **05**



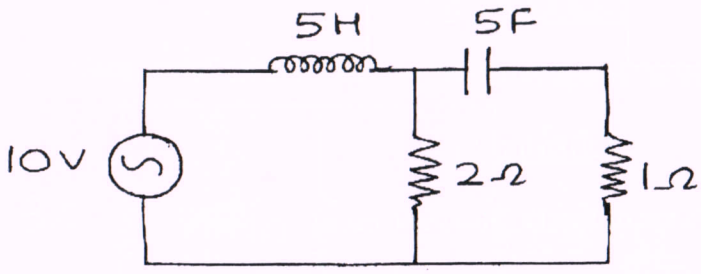
d) State and prove the maximum power transfer theorem. **05**

MODULE-II

Q.3 a) With a neat sketch, define the following with reference to a network graph. **05**

i) Path
ii) Branch
iii) Node
iv) Loop
v) Tree.

b) Draw the dual of the network shown. Enumerate the steps involved. **07**

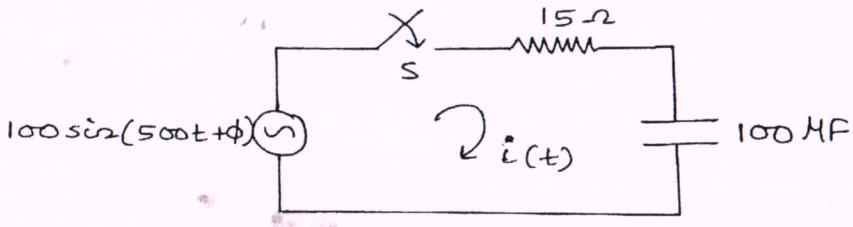


c) Draw the oriented graph from the complete incidence matrix given below and determine the number of possible trees. **08**

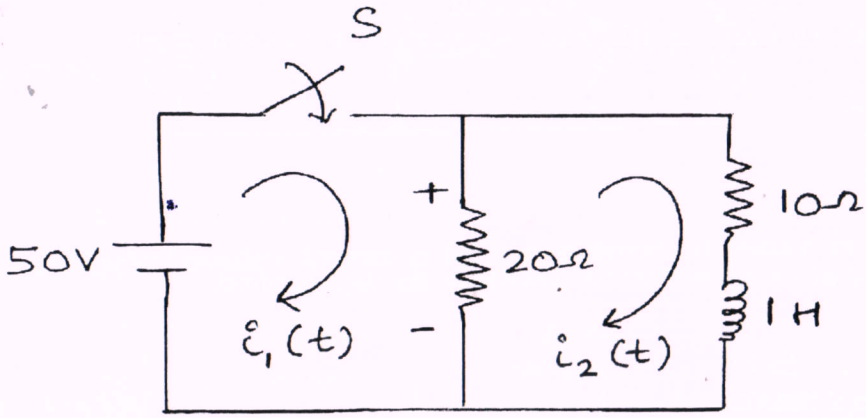
A_a=

Nodes	Branches					
	1	2	3	4	5	6
A	-1	0	0	1	-1	0
B	1	-1	0	0	0	-1
C	0	1	-1	0	1	0
D	0	0	1	-1	0	1

Q.4 a) A sinusoidal voltage $v = 100\sin(500t + \phi)$v is applied to the circuit at time corresponding to $\phi = 45°$. Obtain the current transient when switch S is closed at time t=0. **10**



b) In the circuit shown below, obtain the equations for $i_1(t)$ and $i_2(t)$ when the switch S is closed at t=0. Use the Laplace transform method. **10**

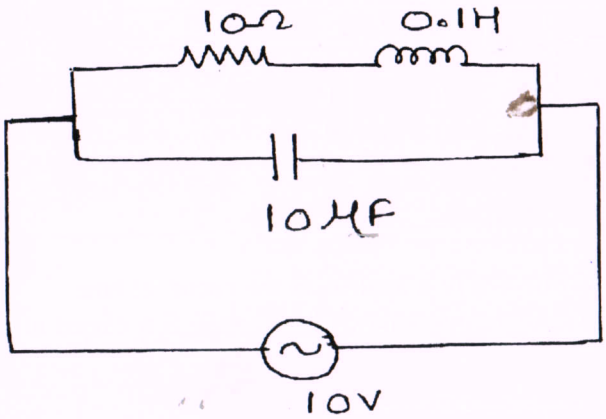


MODULE III

Q.5 a) Derive the equation for Q factor of Parallel Resonant circuit. **09**

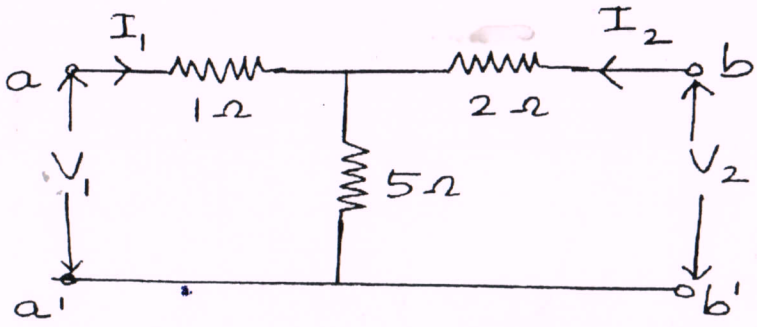
b) Explain how the impedance of series resonance circuit varies with frequency, with the help of suitable plots. **07**

c) For the tank circuit shown, find the resonant frequency. **04**



Q.6 a) Derive the Y parameters for a two port network in terms of the Z parameters. **07**

b) Find ABCD parameters for the circuit shown **07**



c) Derive the hybrid parameters of two-port network in terms of Y parameters. **06**

MODULE – IV

Q.7 a) Derive the design equations for Bridged -T attenuator. **08**

b) Design a Low Pass Filter (both π and T sections) having cut-off frequency of 2KHz to operate with a terminated load resistance of 500 Ω. **07**

c) Design a T-pad attenuator to give an attenuation of 60 dB and to work in a line of 500 Ω impedance. **05**

Q.8 a) Obtain the second Foster form for the following function. **08**

$$Z(s) = \frac{3(S+2)(S+4)}{(S+1)(S+3)}$$

b) Find the first cauer form of the function. **08**

$$Z(s) = \frac{(S+3)(S+7)}{(S+2)(S+4)}$$

c) State the properties of positive real functions. **04**