Code No:21ES1107 **RM21** **SET - 2**

I B.Tech I Semester Regular Examinations, May -2022

Basic Electrical Engineering-I

(ECE Branch)

Time : 3 Hours Max.Marks:70

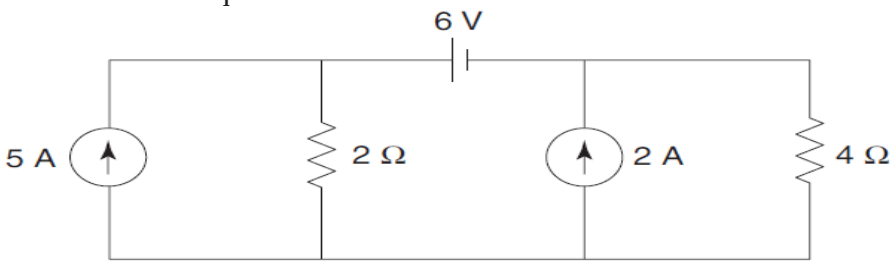
Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

UNIT -I

1 A) Illustrate Ohm's Law with an example. 4M

B) Explain Kirchhoff's Laws with a suitable example. 4M

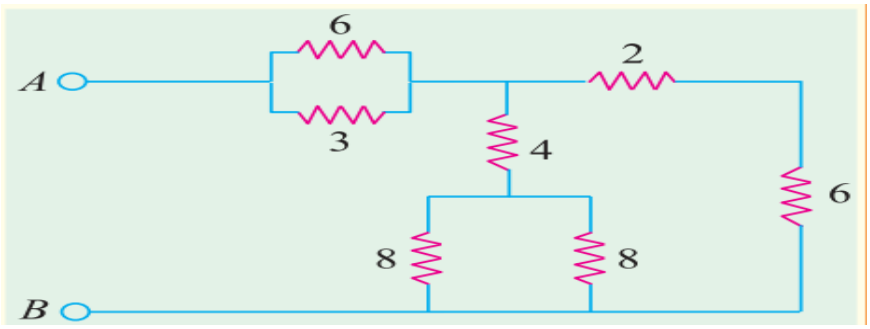
C) Find the current in the 4Ω resistor shown in network of fig.using source transformation technique.



6M

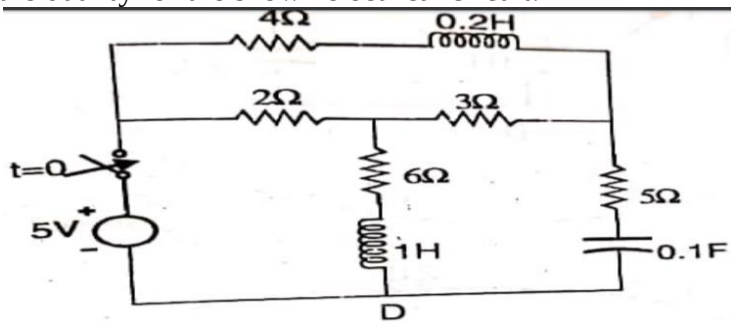
OR

2 A) Find the equivalent resistance of the network of fig. between terminals A and B. All resistance values are in ohms.



7M

B) Construct the duality for the shown electrical circuit.



7M

UNIT -II

3 A) Develop the mathematical expressions for a sinusoidal quantity response to an element of a pure capacitance connected across a sinusoidal excitation. 7M

B) A resistance of 20Ω, inductance of 0.2 H and capacitance of 150 μF are connected in series and are fed by a 230 V, 50 Hz supply. Estimate X_L, X_C,X, Z, Y, p.f., active power, reactive power and apparent power. 7M

OR

4 A) A choke coil of resistance 8Ω and inductance 0.15H is connected in series with a capacitor of capacitance 125μF across a 230V, 50Hz supply. Determine: (i) Inductive Reactance (ii) Capacitive Reactance (iii) Impedance (iv) Current (v) Voltage across the choke coil and the capacitor, respectively (vi) phase difference between the current and the supply voltage. 6M

B) A resistance of 20Ω in parallel with a pure inductance of 200mH is connected to a 230V,50Hz supply. Determine the total current drawn from the supply and the phase angle between the voltage and the total current. 4M

C) A resistance of 10Ω is connected in series with a 50 mH inductance across a 230V, 50Hz supply. Determine (i). The current flowing in the circuit (ii). The phase angle of current. 4M

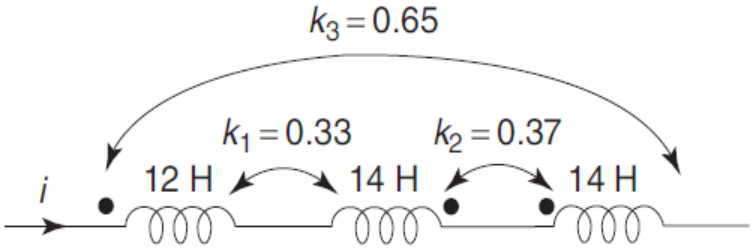
UNIT -III

5 A) Illustrate about (i) Self-Inductance and (ii) Mutual Inductance in a magnetic circuit. 7M

B) Two identical 750 turn coils A and B lie in parallel planes. A current changing at the rate of 1500 A/s in A induces an e.m.f. of 11.25 V in B. Calculate the mutual inductance of the arrangement. If the self-inductance of each coil is 15 mH. Estimate the flux produced in coil A per ampere and the percentage of this flux which links the turns of B. 7M

OR

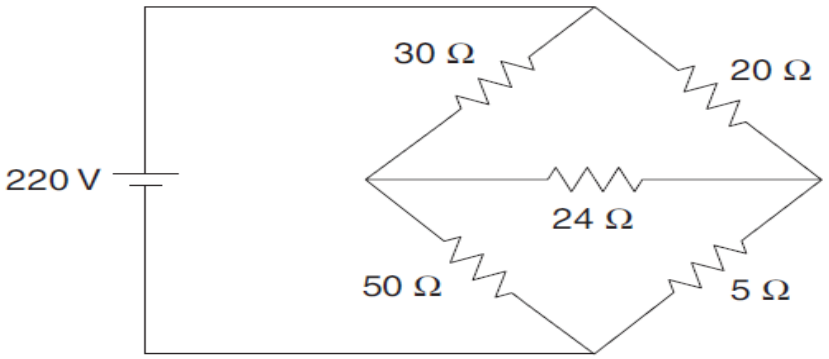
6 A) Find the equivalent inductance of the network shown in Fig. 7M



B) A series R-L-C circuit consists of R = 1000 Ω, L = 100 mH and C = 10 picofarads. The applied voltage across the circuit is 100 V. (i) Find the resonant frequency of the circuit. (ii) Find the quality factor of the circuit at the resonant frequency. (iii) At what angular frequencies do the half power points occur? (iv) Calculate the bandwidth of the circuit. 7M

UNIT -IV

7 A) Determine the current through the 24 Ω resistor in fig. Apply Thevenin's theorem. 7M

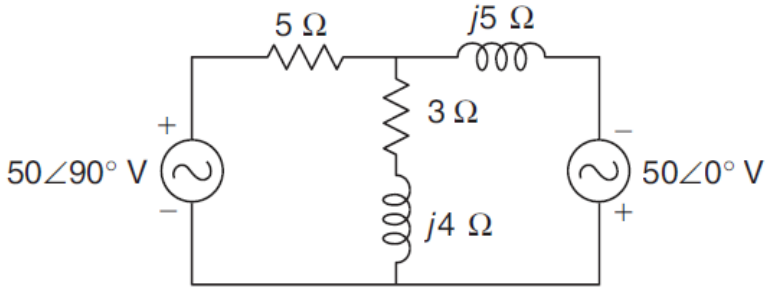


B) Explain Reciprocity Theorem statement and prove it with a suitable circuit under dc excitation. 7M

OR

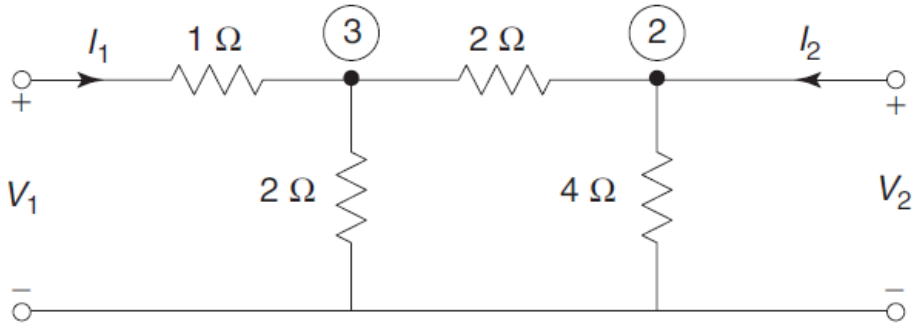
8 A) Illustrate Maximum Power Transfer Theorem statement and prove it with a suitable circuit under a dc excitation. 7M

B) Find the current through the (3 + j4) Ω impedance. Using Superposition theorem. 7M

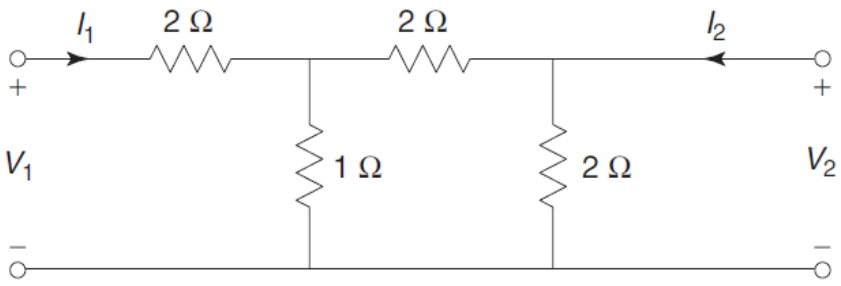


UNIT -V

9 A) Determine Admittance (Y) parameters for the network shown in fig. Determine whether thenetwork is symmetrical and reciprocal. 7M

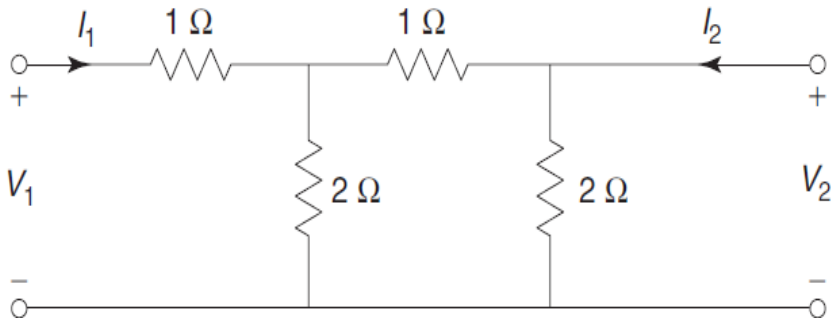


B) Two identical sections of the network shown in fig. are connected in cascade.Obtain the transmission parameters of the overall connection. 7M



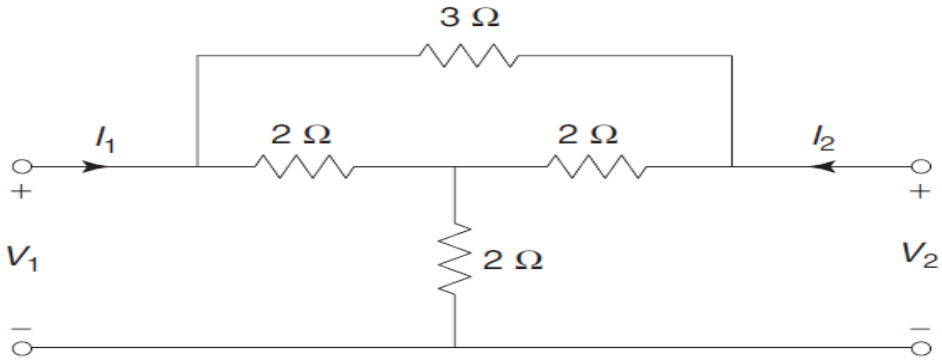
OR

10 A) Obtain Transmission (ABCD) parameters for the network shown in fig.



7M

B) Determine Admittance(Y) parameters for the parallel connected networks shown in fig.



7M