

Code No: R13212

R13

SET-1

I B. Tech II Semester Supplementary Examinations, April/May - 2018
ELECTRICAL CIRCUITS ANALYSIS-I
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is Compulsory
3. Answer any THREE Questions from Part-B

PART -A

1. a) A delta-connected network consists of three resistors 5Ω , 6Ω and 9Ω . Convert the delta-connected network into an equivalent star-connected network. (4M)
- b) In a series RC circuit, the current and voltage are given as $i = \cos(314t - 20^\circ)$, $v = 10\cos(314t + 10^\circ)$. Find the values of R and L. (4M)
- c) Obtain the resonance condition in series R L C circuit. (4M)
- d) Compare electrical and magnetic circuits (4M)
- e) What are the Planar and Non planar networks? (3M)
- f) State Maximum power transfer theorem in AC circuits. (3M)

PART -B

2. a) Obtain the equivalent resistance R_{ab} in the circuit shown in figure 2(a). (8M)

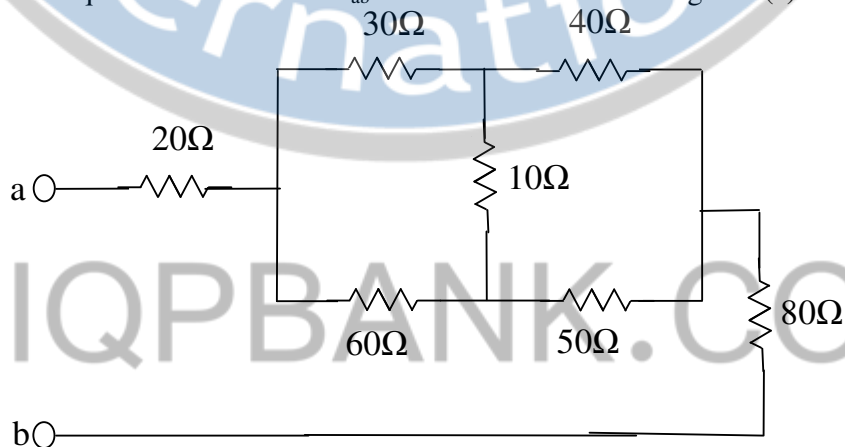


Figure 2(a)

- b) Use nodal analysis to find the power delivered by the 2 V source in figure 2(b). (8M)

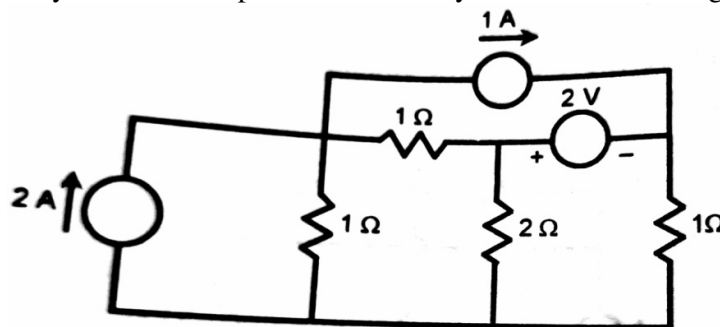


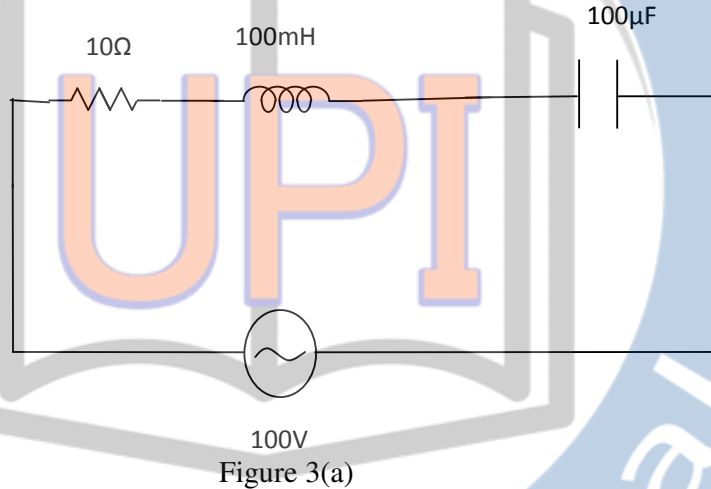
Figure 2(b)

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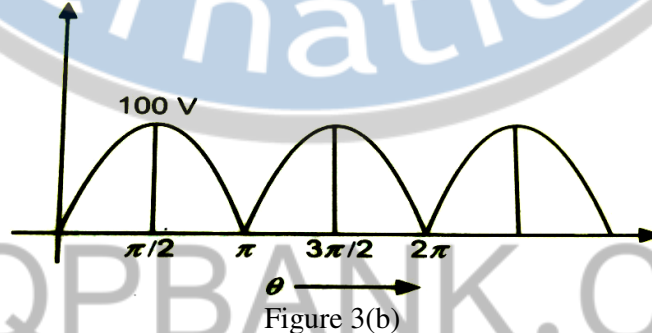
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3. a) A series circuit consisting of a 10 ohm resistor, 100 μ F capacitance and a 10 mH inductance is driven by a 50 Hz AC voltage source of maximum value 100 volts. Calculate the equivalent impedance, current in the circuit, the power factor and power dissipated in the circuit. (8M)



- b) Find the rms value, average value and form factor of the voltage wave form shown in figure 3(b). (8M)



4. An inductance of 0.5 H, a resistance of 5 ohm, and a capacitance of 8 μ F are in series across a 220 V AC supply. Calculate the frequency at which the circuit resonates. Find the current at resonance, bandwidth, half power frequencies and the voltage across capacitance at resonance. (16M)
5. a) A coil of 500 turns is wound uniformly over a wooden ring having a mean circumference of 50 cm and a cross sectional area of 500 mm². If the current through the coil is 3A, calculate (8M)
- The magnetic field strength
 - The flux density and
 - The total flux
- b) Define coefficient of coupling and derive its expression. (8M)

6. a) For the graph shown in figure 6(a), select a tree, obtain the tie-sets and cut-set matrices. (8M)

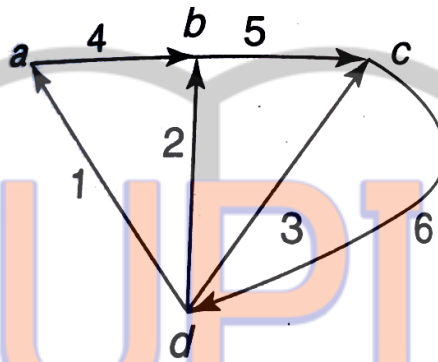


Figure 6(a)

- b) Explain the procedure for constructing dual networks and obtain the dual of a network shown in figure 6(b). (8M)

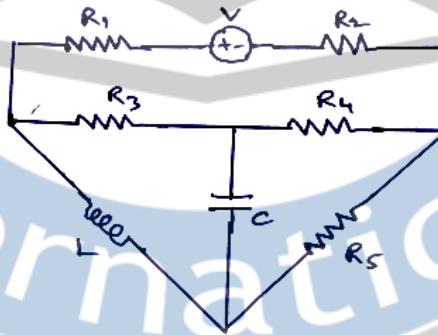


Figure 6(b)

7. a) Use Thevenin's theorem to find the power in the 10Ω resistor connected across the terminals a,b shown in figure 7(a). (8M)

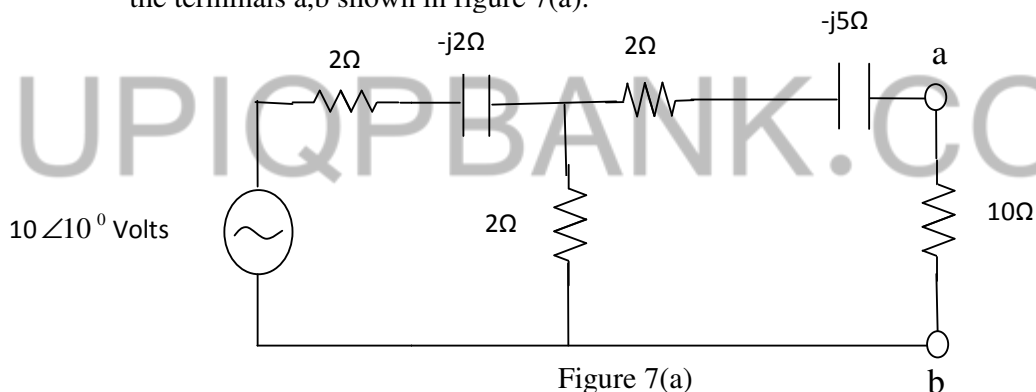


Figure 7(a)

- b) Using superposition theorem, calculate the current i_s in the network shown in figure 7(b). (8M)

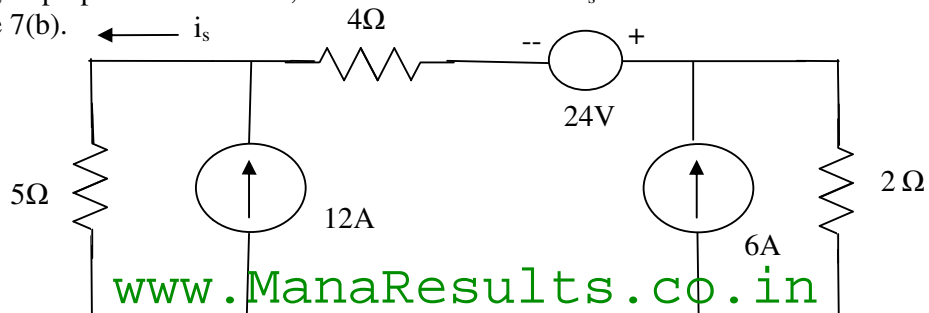


Figure 7(b)