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# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech I Semester End Examinations (Regular) - November, 2018

Regulation: IARE – R18

## FUNDAMENTALS OF ELECTRICAL ENGINEERING

Time: 3 Hours

(Common to CSE | IT | CE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

### UNIT – I

1. (a) Determine the equivalent capacitance between the terminals A and B for Figure 1. [7M]

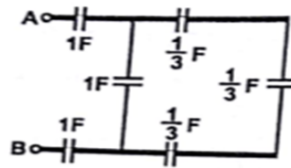


Figure 1

- (b) Find the currents  $I_1$ ,  $I_2$  and  $I_3$  from the given circuit. [7M]

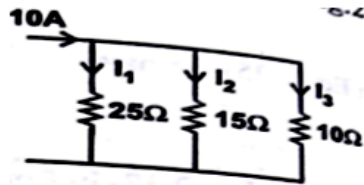


Figure 2

2. (a) State and explain Kirchhoff's laws with example? [7M]  
 (b) Find the equivalent resistance between the terminals A and B for Figure 3. [7M]

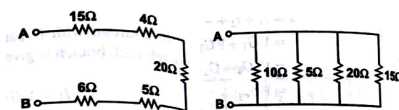


Figure 3

## UNIT – II

3. (a) Find the equivalent resistance between a & b in the network shown in Figure 4 using Delta –Star Transformation. [7M]

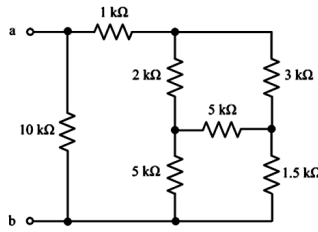


Figure 4

- (b) Find out  $V_1$  and  $V_2$  using KVL. Also find power dissipated in  $3\Omega$  for Figure 5. [7M]

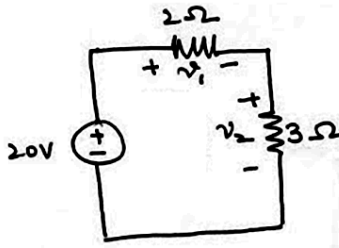


Figure 5

4. (a) Find the all branch currents and power observed by each resistor for the circuit given in Figure 6. [7M]

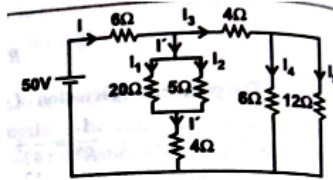


Figure 6

- (b) Find the 'V' and 'I' from the circuit given in Figure 7 by mesh analysis? [7M]

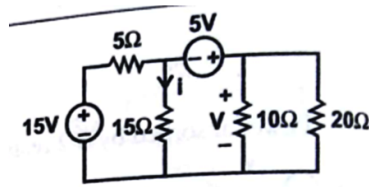


Figure 7

### UNIT – III

5. (a) Derive impedance equation of parallel RLC circuit for figure 8. [7M]

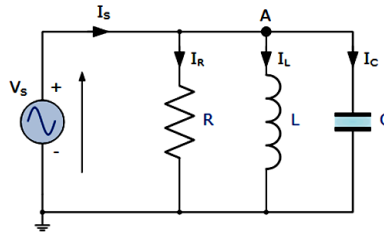


Figure 8

- (b) A wound coil that has an inductance of 180mH and a resistance of  $35\Omega$  is connected to a 100V, 50Hz supply. Calculate: [7M]
- i) The impedance of the coil
  - ii) The current
  - iii) The power factor
  - iv) The apparent power consumed.
6. (a) Derive RMS value, average value, form factor, Peak factor of an alternating quantity. [7M]
- (b) Determine the current in 3 ohm resistance in the circuit for Figure 9. [7M]

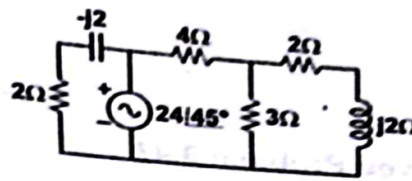


Figure 9

### UNIT – IV

7. (a) Draw the oriented graph for the bi network shown in Figure 10. Find the tie-set schedule and determine the loop currents. [7M]

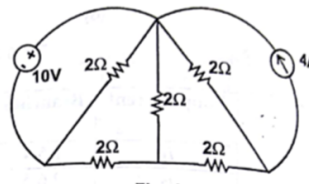


Figure 10

- (b) Construct the dual network for the network given in Figure 11? [7M]

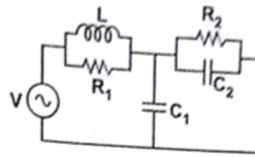


Figure 11

8. (a) Explain in detail about the concept of dual and duality? [7M]  
 (b) For the given network graph given in Figure 12, construct the basic cut set matrix, tracking element 1, 6, 8, 3 as tree branches, Express the link branch voltage in terms of the tree branch voltages. [7M]

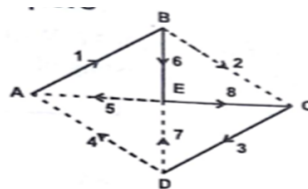


Figure 12

**UNIT – V**

9. (a) Find the value of R in the following circuit in Figure 13. Such that maximum power transfer takes place. What is the amount of this power? [7M]

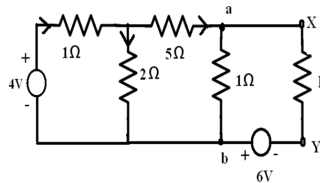


Figure 13

- (b) Find the Thevenin's Equivalent circuit from the given network given in Figure 14 [7M]

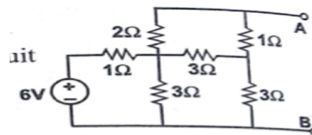


Figure 14

10. (a) State millman's theorem, Explain the procedure for solve the problems. [7M]  
 (b) State superposition theorem with an example. [7M]

