

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Winter 2022 - 23 Examination**

Semester: 3  
 Subject Code: 203106205  
 Subject Name: Electrical Circuit Analysis

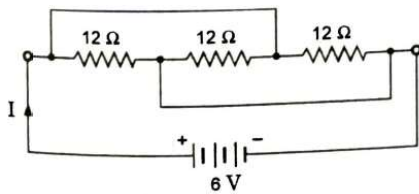
Date: 08/10/2022  
 Time: 02:00 pm to 04:30 pm  
 Total Marks: 60

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 Objective Type Questions - ( Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) (15)**

1. In nodal analysis, if there are N nodes in the circuit, then \_\_\_\_\_ equations will be written to solve the network.
2. In accordance to Laplace domain theory, the transform admittance of resistance is \_\_\_\_\_.
3. For the circuit shown below the equivalent resistance will be \_\_\_\_\_.

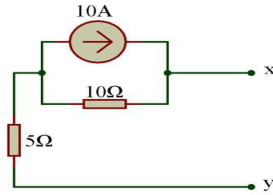


4. A 2-port resistive network satisfy the condition  $A = D = 3/2B = 4/3C$ . The  $z_{11}$  of the network is \_\_\_\_\_.
5. RLC parallel circuit, if current through capacitor and inductor is equal, then power factor would be \_\_\_\_\_.
6. The circuit whose properties are same in either direction is known as \_\_\_\_\_ circuit.
7. An electric circuit with 10 branches and 7 nodes will be \_\_\_\_\_ loop equation.
8. Laplace transform of a unit impulse function is \_\_\_\_\_.
9. The integral of a step function is \_\_\_\_\_.
10. Three resistors of 6 ohm are connected in parallel. So, there equivalent resistance would be \_\_\_\_.
11. The superposition theorem is applicable to
  - a) Voltage only
  - b) Current only
  - c) Both current and voltage
  - d) Current, voltage and power
12. "Any number of current sources in parallel may be replaced by a single current source whose current is the algebraic sum of individual currents and source resistance is the parallel combination of individual source resistances".  
 The above statement is associated with
  - a) Thevenin's theorem
  - b) Millman's theorem
  - c) Maximum power transfer theorem
  - d) None of the above
13. An ideal voltage source should have
  - a) Large value of e.m.f.
  - b) Small value of e.m.f.
  - c) Zero source resistance
  - d) Infinite source resistance
14. "In any linear bilateral network, if a source of e.m.f. E in any branch produces a current I in any other branch, then same e.m.f. acting in the second branch would produce the same current / in the first branch". The above statement is associated with
  - a) Compensation theorem
  - b) Superposition theorem
  - c) Reciprocity theorem
  - d) None of the above
15. A capacitor is generally a
  - a) Bilateral and active component
  - b) Active, passive, linear and nonlinear component
  - c) Linear and bilateral component
  - d) Nonlinear and active component

**Q.2 Answer the following questions. (Attempt any three)**

**(15)**

**A)** Find Norton's equivalent circuit to the left of terminal x-y in the network of



- B) Explain Maximum power transfer theorem
- C) List down and explain types of network topologies.
- D) Explain Inductor at initial and final conditions in network.

**Q.3 A)** Explain Thevenin's theorem with proper example.

**(07)**

**B)** Explain Supermesh and Supernode.

**(08)**

**OR**

**B)** Explain source transformation and source shifting.

**(08)**

**Q.4 A)** Explain Series R-L circuit.

**(07)**

**OR**

**A)** Explain Compensation theorem.

**(07)**

**B)** Explain super position theorem with proper example.

**(08)**