

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Winter 2019 - 20 Examination**

**Semester: 3**  
**Subject Code: 203107205/03107202/203112203**  
**Subject Name: Network Theory**  
**Circuits & Network**

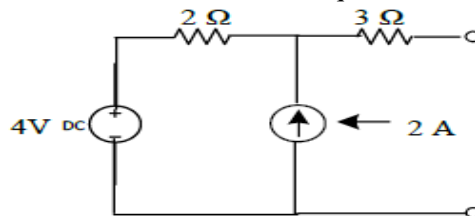
**Date: 02/12/2019**  
**Time: 02:00 pm to 04:30 pm**  
**Total Marks: 60**

**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 (All are compulsory) (Each of one mark) (15)**

1. An ideal voltage source has  
 (a) infinite source resistance (b) zero source resistance (c) large value of source resistance (d) finite value of source resistance
2. Kirchhoff's laws are applicable to  
 (a) dc only (b) as sinusoidal wave only (c) dc and ac sinusoidal waves (d) all wave shapes
3. In the following circuit what is the value of Thevenin equivalent voltage?



- (a) 8 (b) 6 (c) 9 (d) 4

4. A closed path made by several branches of the network is known as  
 (a) Branch (b) Loop (c) Circuit (d) Junction
5. The concept on which superposition theorem based on?  
 (a) Reciprocity (b) Non linearity (c) Duality (d) Linearity
6. \_\_\_\_\_ is the time rate of change of charge.
7. \_\_\_\_\_ is the required condition for maximum power transfer theorem.
8. \_\_\_\_\_ techniques convert voltage source to current source and vice-versa.
9. \_\_\_\_\_ Symmetrical condition for z-parameters of two port network.
10. \_\_\_\_\_ parameters is called short circuit parameter for network analysis.
11. To move charge  $q$  from point a to point b requires 30J. Find the voltage drop  $V_{ab}$  for charge 6C?
12. Define: tie-set
13. What is the significant of Time constant in transient analysis of network?
14. If network contain N no. of nodes and B no. of branch then how many links are possible?
15. Write any one application of maximum power transfer theorem.

**Q.2 Answer the following questions. (Attempt any three) (15)**

- A) For the circuit shown in **Fig.1**, find the node voltages of **Fig.1**
- B) Derive the essential condition for Maximum power transfer theorem of DC network.
- C) Explain source transformation and combination of sources.
- D) Find the current through RL whose value is  $6\Omega$  in **Fig.2**

**Q.3 A) Obtain transient response of series RLC circuit. (07)**

- B) Define two port network and obtain symmetrical and reciprocity conditions for Y-parameter of two port network. (08)

**OR**

- B) Obtain Y-parameter in terms of Z-parameter and h-parameter. (08)

**Q.4 A) Find the Thevenin equivalent of the circuit in Fig.3 at terminals a-b. (07)****OR**

- A) In the network of **Fig.4**, if the switch has remained in position A for a long time and then moves to position B at  $t=0$ . Find and plot  $V_c(t)$  for  $t \geq 0$  for  $R_2 = 405\Omega$ . (07)

- B) What is the time constant? Obtain transient response of series RL circuit and calculate time (08)

constant.

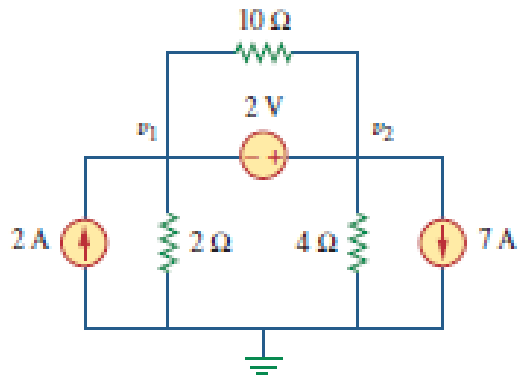


Fig.1

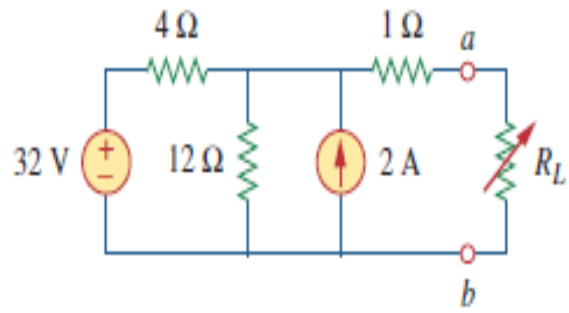


Fig.2

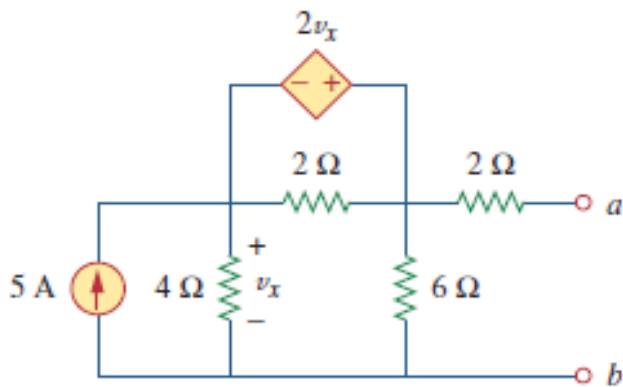


Fig.3

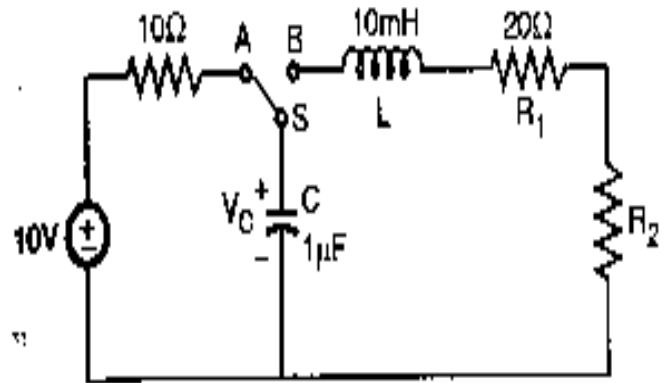


Fig.4