Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2019 - 20 Examination

Semester: 3 **Date:02/12/2019**
Subject Code: 203107205/03107202/203112203 **Time: 02:00 pm to 04:30 pm**
Subject Name: Network Theory **Total Marks: 60**
Circuits & Network

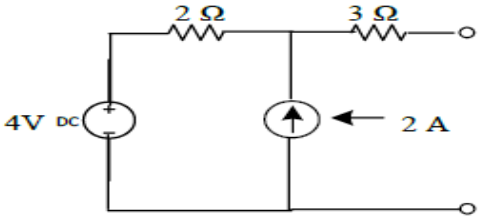
Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

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 6Ω 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 tow 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.

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 Vc (t) for $t \geq 0$ for R2= 405Ω. **(07)**

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

constant.

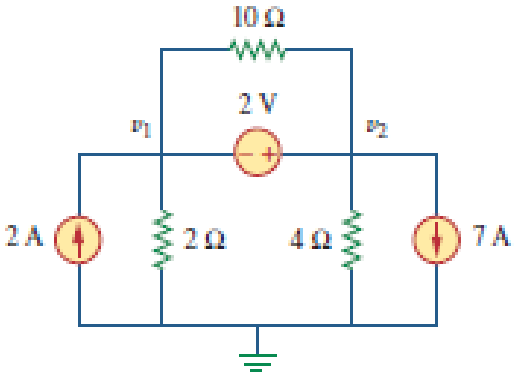


Fig.1

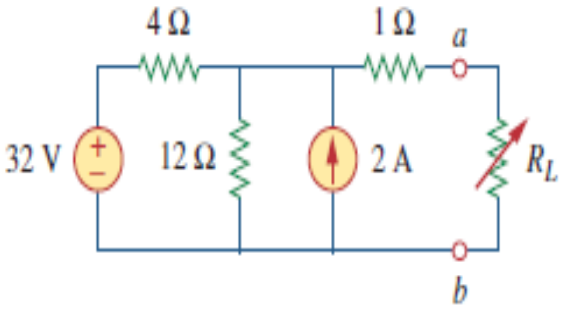


Fig.2

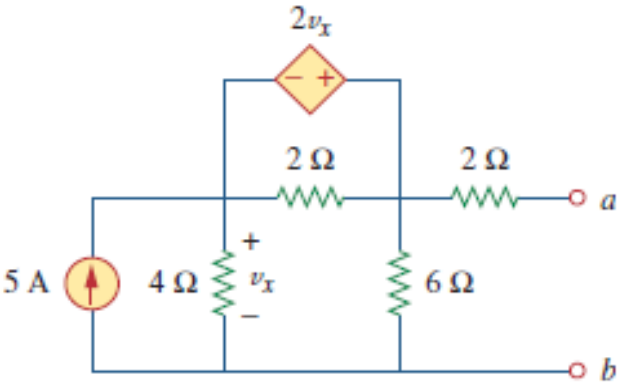


Fig.3

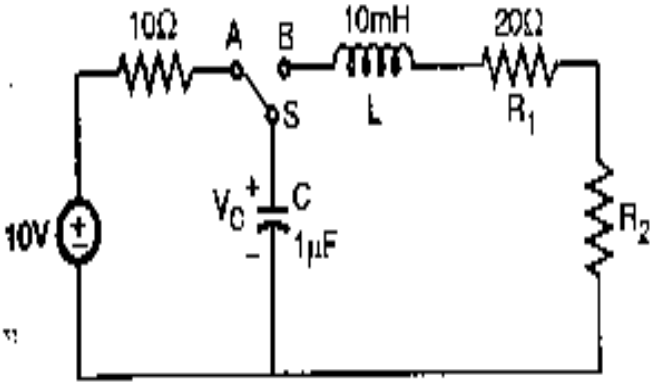


Fig.4