

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Summer 2018 – 19 Examination

Semester: 3**Subject Code: 03107202****Subject Name: Circuit & Network****Date: 27/05/2019****Time: 02:00pm to 04:30pm****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.

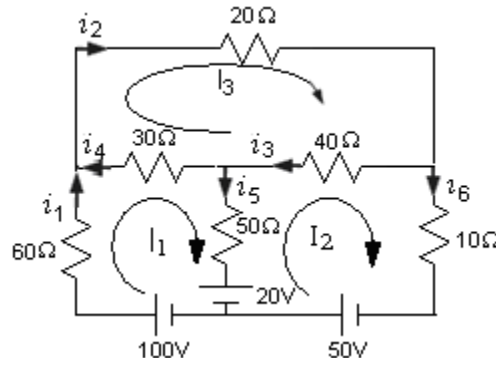
Q.1 Objective Type Questions -**(15)**

1. The circuit whose properties are same in either direction is known as
 - a) unilateral circuit
 - b) bilateral circuit
 - c) irreversible circuit
 - d) reversible circuit
2. Application of Norton's theorem to a circuit yields
 - a) equivalent current source and impedance in series
 - b) equivalent current source and impedance in parallel
 - c) equivalent impedance
 - d) equivalent current source
3. Millman's theorem yields
 - a) equivalent resistance
 - b) equivalent impedance
 - c) equivalent voltage source
 - d) equivalent voltage or current source
4. The superposition theorem requires as many circuits to be solved as there are
 - a) sources, nodes and meshes
 - b) sources and nodes
 - c) sources
 - d) nodes
5. 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
6. Define:- Branch
7. What is undirectional graph?
8. What is active component?
9. What is passive component?
10. Define high pass filter.
11. Cut-set matrix gives relation between _____ and _____
12. Incidence matrix gives relation between _____ and _____
13. _____ techniques convert voltage source to current source and vice-versa.
14. The Laplace transform of unit step function is _____
15. The impulse function is defined at $t =$ _____

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

- A) State and explain Kirchhoff's laws.
- B) Explain independent sources.
- C) Define following terms:
 - 1) Graph 2) Loop 3) Tree 4) Co-tree 5) Cut-set
- D) Derive Laplace transform of ramp function.

Q.3 A) Use loop analysis to write matrix equations of the selected loop currents. Find the branch currents (07)



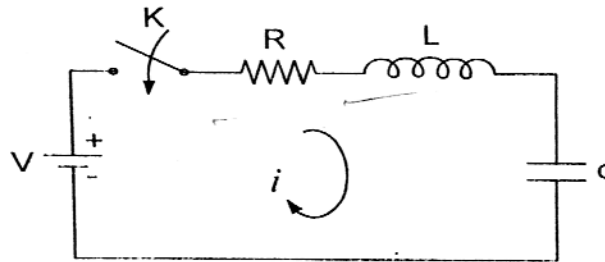
B) Explain Y-parameter and draw its equivalent circuit. Derive condition of reciprocity and symmetry of Y parameter. (08)

OR

B) Obtain the Laplace Transform for $f1(t)=t$ and $f2(t)=e^{-at}$ (08)

Q.4 A) In the network of the figure, the switch k is closed at $t=0$ with the capacitor uncharged and with (07)

zero current in the inductor. Find the values of i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t=0^+$ if $v=10v$, $R=10\Omega$, $L=1H$ and $C=10\mu F$.



OR

A) Explain low pass filter, high pass filter and band pass filter in details. (07)

B) For the Network shown in fig, Draw the oriented Graph and all possible trees. Determine (1)The (08)
Incidence Matrix. (2) Fundamental Tie set Matrix. (3)Fundamental cut set Matrix.

