

Paper ID & Roll No. to be filled in your Answer Book

Roll No.

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**B.Tech. (III SEM.)-2013**

**Basic Network Analysis**

Time : Three Hours]

[Max. Marks : 100

**NOTE:** Attempt ALL the questions.

**SECTION - A**

1. Attempt any four of the following: [5x4]
  - (a) Differentiate between periodic and non periodic signals.
  - (b) What do you understand by unit step, unit ramp and unit impulse functions?
  - (c) Two ramp functions are given by-  
 $f_1(t)=m(t)u(t)$  and  $f_2(t)=m(t-a)u(t-a)$ . Draw the final wave form adding these two functions.
  - (d) Discuss time variant and time invariant system with suitable examples.
  - (e) Describe about force current analogy.

(f) What are the linear mechanical elements? Discuss.

**SECTION – B**

2. Attempt any two of the followings: [10×2]

(a) Define Tree and Planar graph. The reduced incidence matrix of a graph is given by-

Obtain the no. of possible trees and draw the oriented graph.

(b) Differentiate with suitable example:

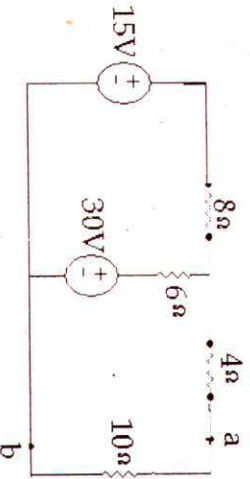
(i) Cut-set and Tie-set

(ii) Direct graph and connected graph

(c) For the network shown below determine:

(i) tie set matrix, (ii) loop impedance matrix

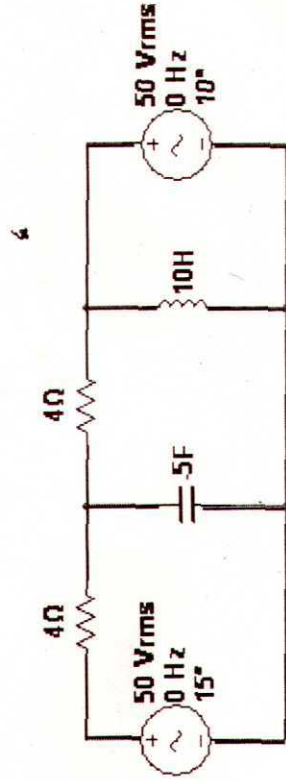
(iii) loop currents



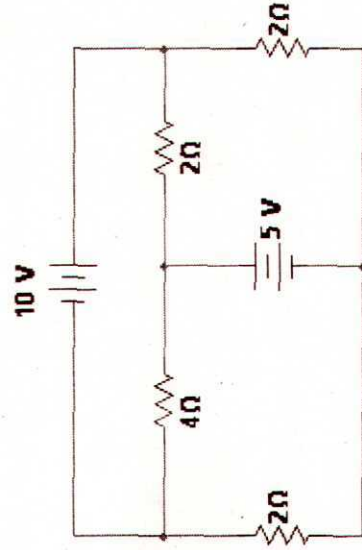
SECTION - C

3. Attempt any two of the followings: [10x2]

- Find the current through the capacitor and voltage across 4Ω resistance of the AC network shown in following figure by using superposition theorem.



- Find the current in 4ohm resistance in the circuit shown below using Norton's Theorem.



(6)

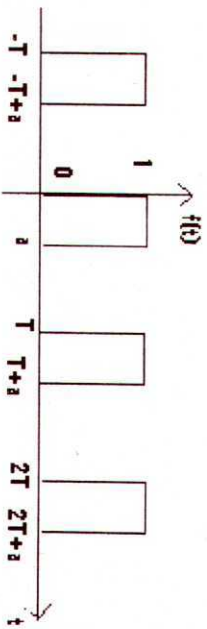
(3)

- (c) State and prove maximum power transfer theorem for an A.C. circuit.

### SECTION – D

4. Attempt any two of the followings: [10×2]

- Find the Fourier series for the wave in as shown in figure below.



- Find the first few terms of the Fourier's series of the function given by
- In a two element series network, voltage  $v(t)$  is applied which is given as

$v(t) = 50 + 50 \sin 5000t + 30 \sin 10000t$  and the resulting current is given as-

$i(t) = 11.2 \sin(5000t + 63.4^\circ) + 10.6 \sin(10000t + 45^\circ)$

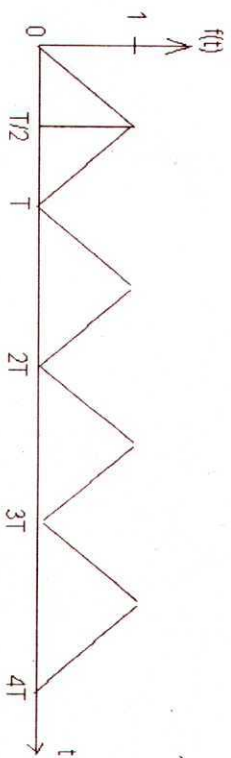
Determine the network element and the power dissipated in the circuit.

(4) TEE-301 / 820 / 4

### SECTION – E

5. Attempt any two of the followings: [10×2]

(a)



Find the Laplace transform of periodic signal shown in figure.

- (b) Determine the Laplace Transformation of –

(i)  $F(t) = 3 - 2$

(ii)  $F(t) = 7 \cos t + 5 \sin t$

(iii)  $F(t) = t \sin t$

(iv)  $F(t) = t^3 + 3t^2 - 6t + 4$

- (c) Explain the following:

(i) Initial Value Theorem

(ii) Final Value Theorem

(iii) Convolution Integral

—x—x—x—

(5) TEE-301 / 820 / 5