

3E1642

Roll No. _____

Total No of Pages: 7

3E1642

B. Tech III Sem. (Main/Back) Exam. Jan. 2016

Electrical Engineering
3EE2A Circuit Analysis – I

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

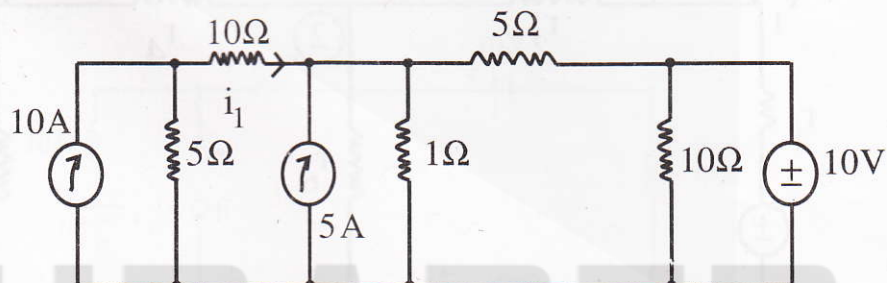
1. NIL

2. NIL

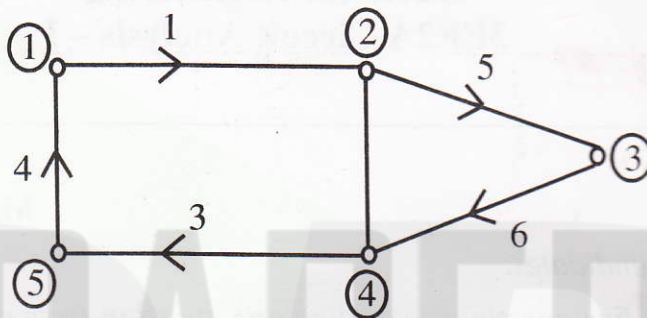
UNIT-I

Q.1 (a) Obtain the current I_1 , using KVL.

[8]

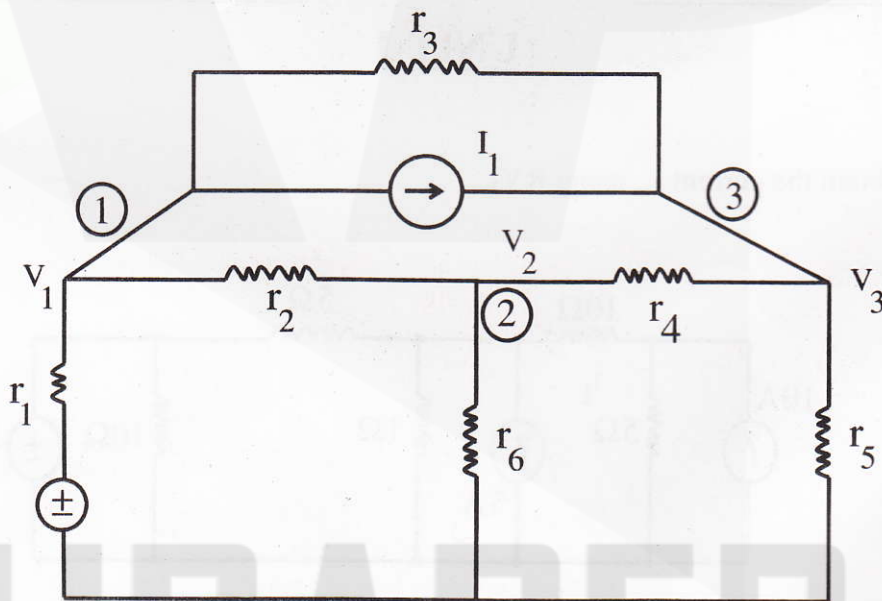


- (b) Show the cut-sets for the graph of the network shown in figure and develop the fundamental cut-set matrix. [8]



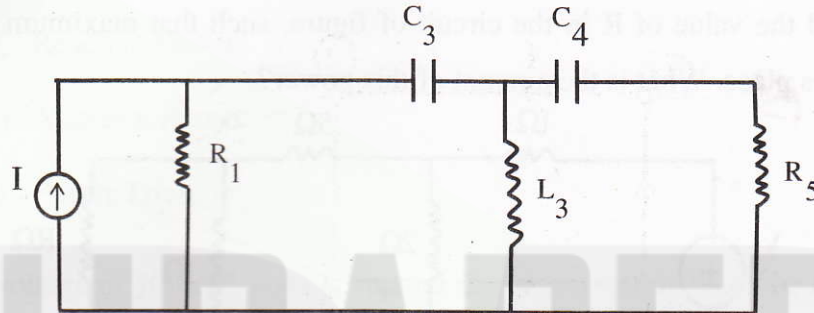
OR

- Q.1 (a) Develop nodal equations in node (1), (2) & (3) in the circuit of figure - [8]



the
[8]

(b) Draw the dual of the network shown in figure. [8]

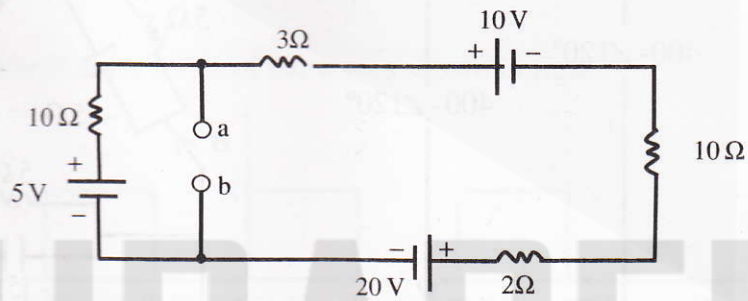


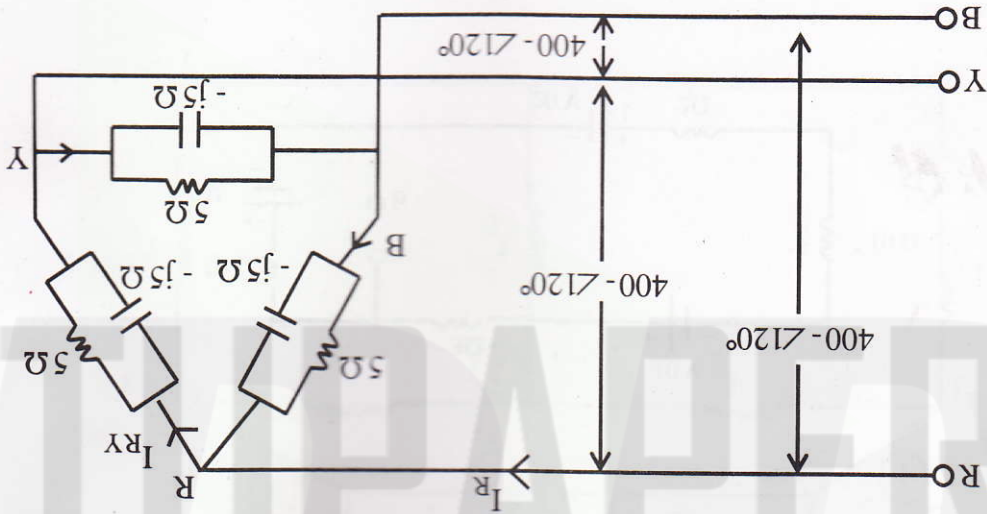
UNIT-II

[8]

Q.2 (a) Explain Thevenin Theorem. Also give the steps for solving a network utilizing Thevenin's Theorem. [8]

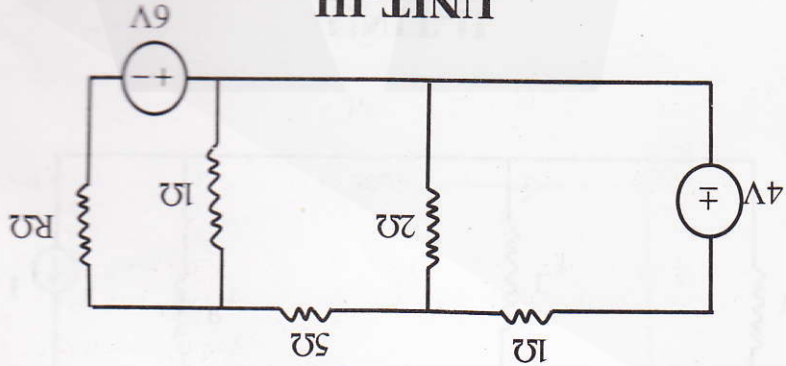
(b) Using Superposition Theorem, find the current through a link that is to be connected between terminals a - b. Assume the link resistance to be zero. [8]





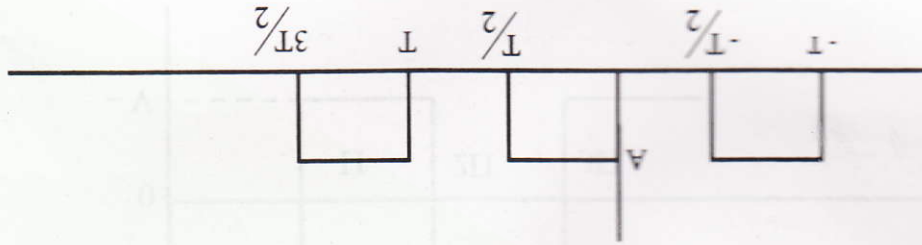
- Q.3 (a) Give the relationship between line and phase voltages and currents in a star-connection. [8]
- (b) A delta-connected load has a parallel combination of resistance (5Ω) and capacitive reactance ($-j5\Omega$) in each phase. If a balanced 3-phase supply is applied between lines, find the phase currents and line currents and draw the phasor-diagram. [8]

UNIT-III



- Q.2 (a) Explain reciprocity theorem and also give the steps for solving a network utilizing reciprocity theorem. [8]
- (b) Find the value of R in the circuit of figure, such that maximum power transfer takes place. What is the amount of this power? [8]

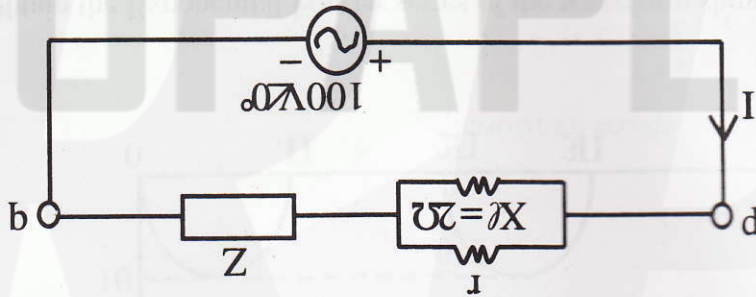
OR



(a)

Q.4 Determine the Fourier series of the waves shown in figure. [8×2=16]

UNIT-IV



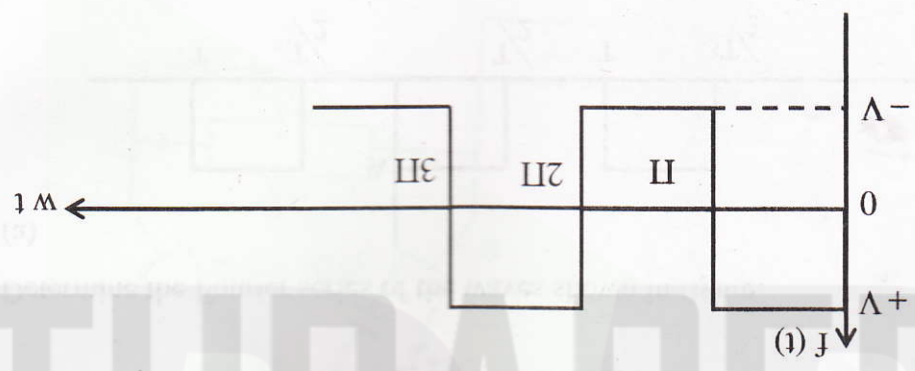
(b) A voltage of $100\angle 0^\circ$ volts is applied across p-q terminals of the circuit shown in figure to produce current of $40\angle 10^\circ$ A. Find the value of Z, when $r = 5\Omega$. What would be the active power consumed in Z? [8]

- (i) Power Factor
- (ii) Reactive Power
- (iii) Apparent Power
- (iv) Power Triangle

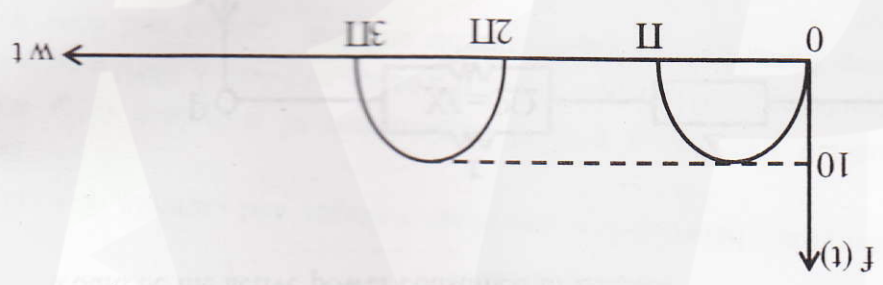
[2×4=8]

OR

Q.3 (a) Give short note on -



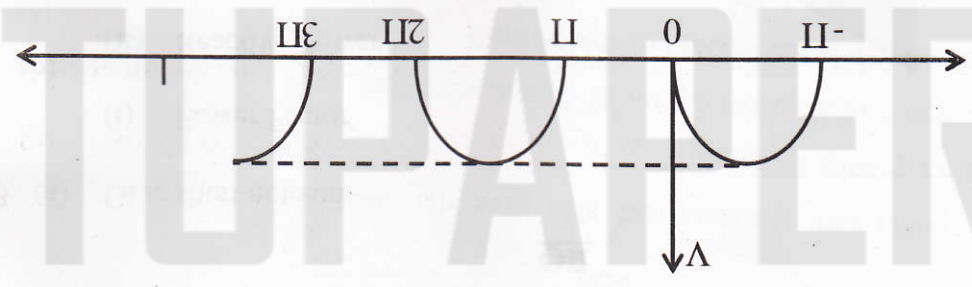
(b) Obtain the Exponential Fourier series of the waveform shown in figure. [8]



Q.4 (a) Obtain the Fourier Coefficients of the waveform shown in figure. [8]

Q.5 Find

OR



(b)
Q.5 (a)

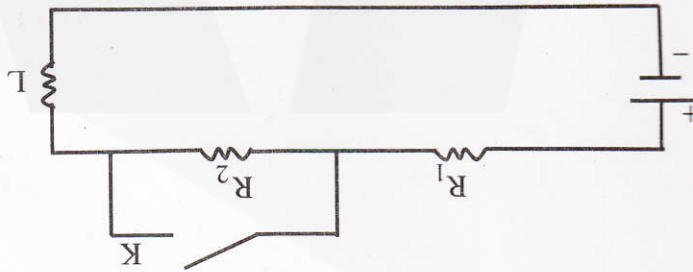
(b)

$$F(s) = \frac{s^2 + 5s + 6}{s^3 + 6s^2 + 11s + 7}$$

Q.5 Find the inverse of the laplace transform.

[16]

OR



$R_2=2\Omega, L=1H, E=10V.$

[8]

complete expression for the current after closing the switch K. Assume $R_1=1\Omega,$

(b) In figure, the battery voltage is applied for a steady state period. Obtain the

Q.5 (a) Explain step response of R-L series circuit.

[8]

UNIT-V