

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:

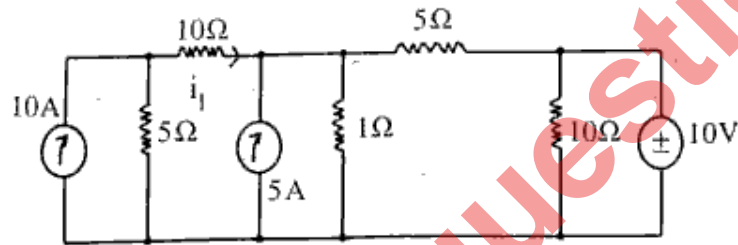
Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

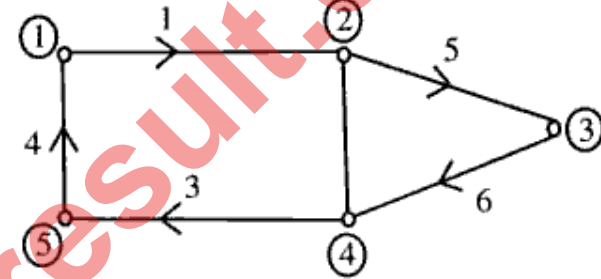
Use of following supporting material is permitted during examination.  
 (Mentioned in form No. 205)

1. NIL \_\_\_\_\_

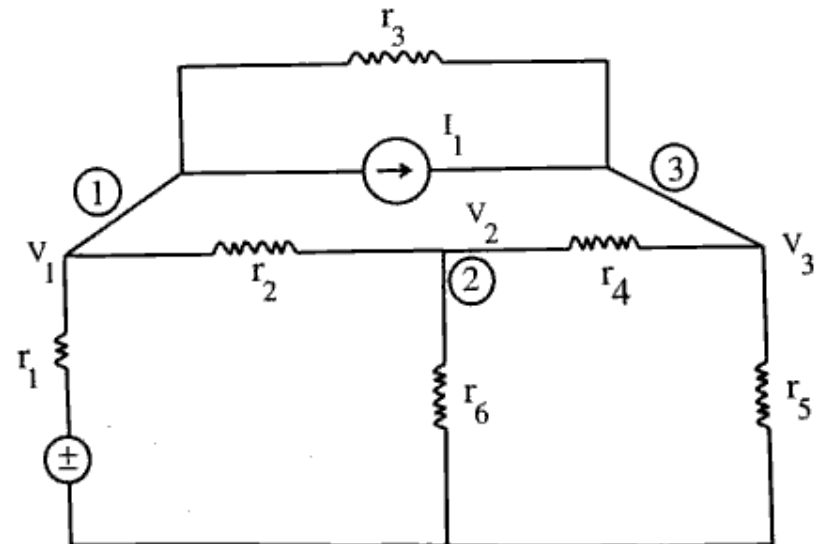
2. NIL \_\_\_\_\_

UNIT-IQ.1 (a) Obtain the current  $I_1$ , using KVL.

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

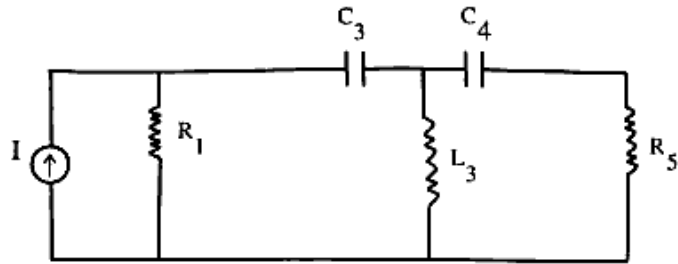
OR

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



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

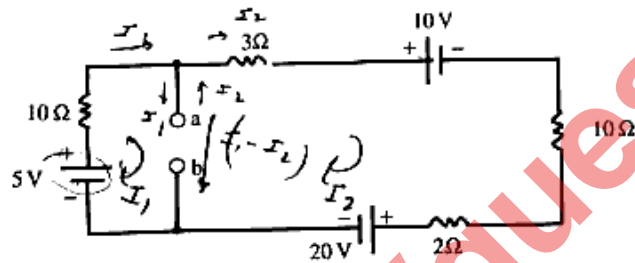
[8]



### UNIT-II

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

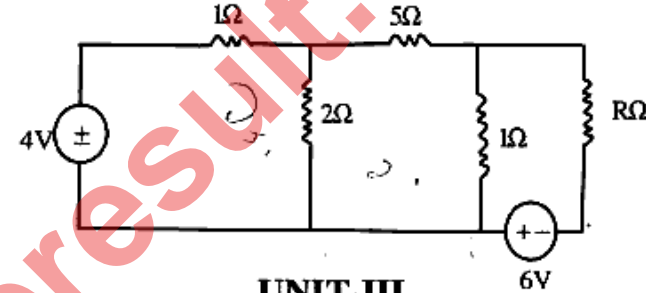
(b) Using Superposition Theorem, find the current through a link that is to be connected between terminals a - b. Assume the link resistance to be zero. [8]



OR

Q.2 (a) Explain reciprocity theorem and also give the steps for solving a network utilizing reciprocity theorem. [8]

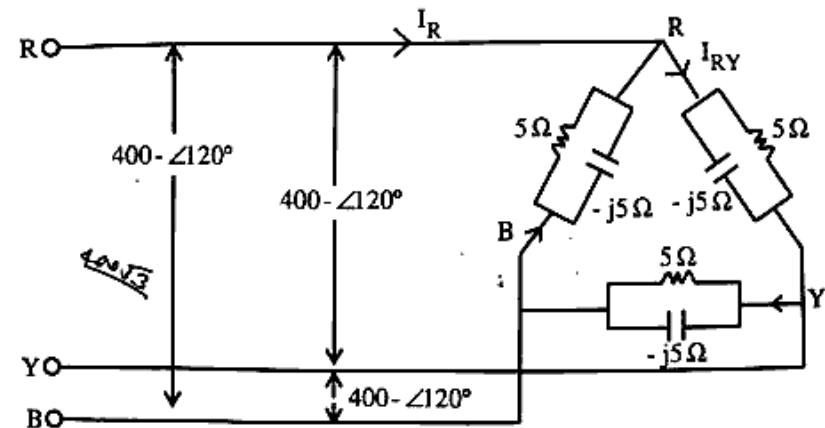
(b) Find the value of R in the circuit of figure, such that maximum power transfer takes place. What is the amount of this power? [8]



### UNIT-III

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 ( $5\Omega$ ) and capacitance reactance ( $-j5\Omega$ ) in each phase. If a balanced 3-phase 400V supply is applied between lines, find the phase currents and line currents and draw the phasor-diagram. [8]



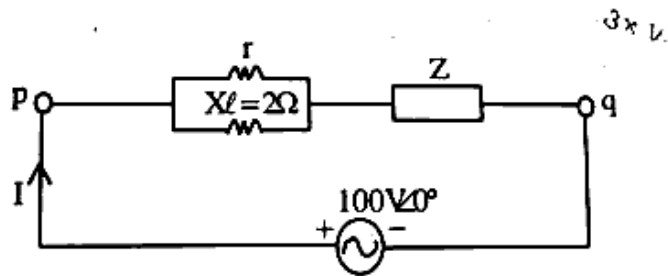
OR

Q.3 (a) Give short note on -

[2×4=8]

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

(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]

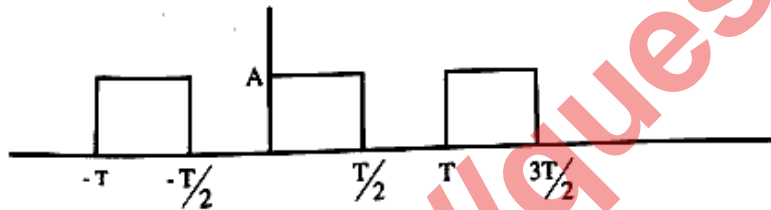


UNIT-IV

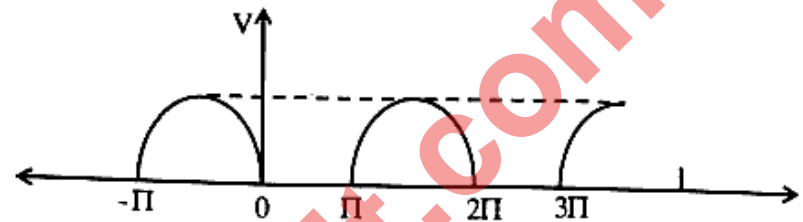
Q.4 Determine the Fourier series of the waves shown in figure.

[8×2=16]

(a)

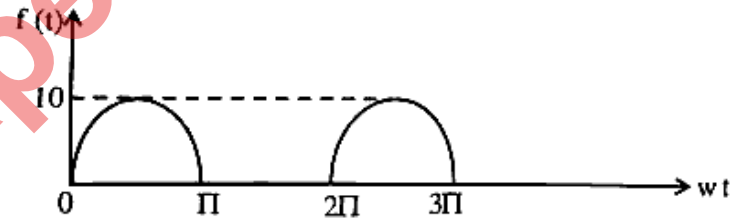


(b)

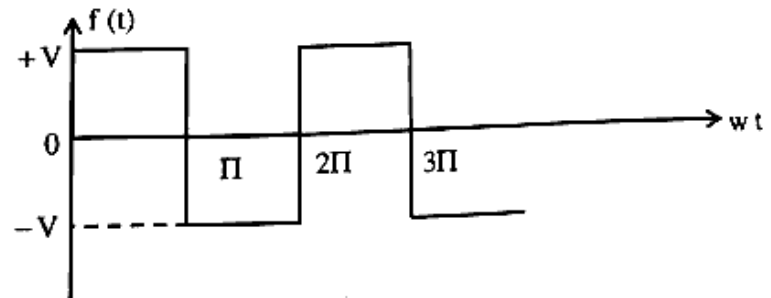


OR

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

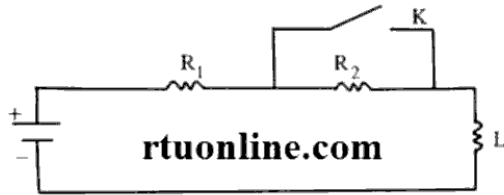


(b) Obtain the Exponential Fourier series of the waveform shown in figure. [8]



**UNIT-V**

- 2.5 (a) Explain step response of R-L series circuit. [8]
- (b) In figure, the battery voltage is applied for a steady state period. Obtain the complete expression for the current after closing the switch K. Assume  $R_1=1\Omega$ ,  $R_2=2\Omega$ ,  $L=1H$ ,  $E=10V$ . [8]



**OR**

- 5 Find the inverse of the laplace transform. [16]

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

<http://questionpaperresult.com>