3E1642

Roll No. _

3E1642

B. Tech. III - Sem. (Back) Exam., Dec. - 2018

Electrical Engineering

3EE2A Circuit Analysis - I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

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

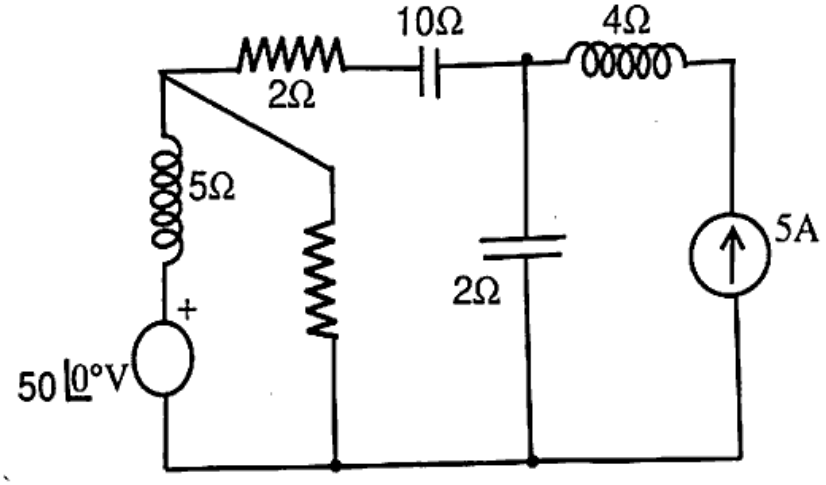
2. NIL

UNIT- I

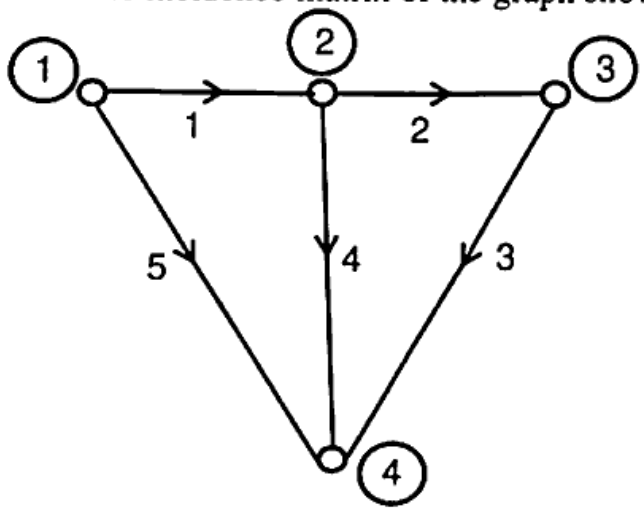
Q.1 (a) Develop the graph of the network shown in the figure given below. Select the tree and write the- [8]

(i) Tie Set Matrix

(ii) Cut – set Matrix



(b) Obtain the incidence matrix of the graph shown as given below. [8]



OR

Q.1 (a) Explain the variation of resistance, inductive and capacitive reactance with frequency. [8]

(b) Write a short note on parallel RLC circuit resonance. [8]

UNIT- II

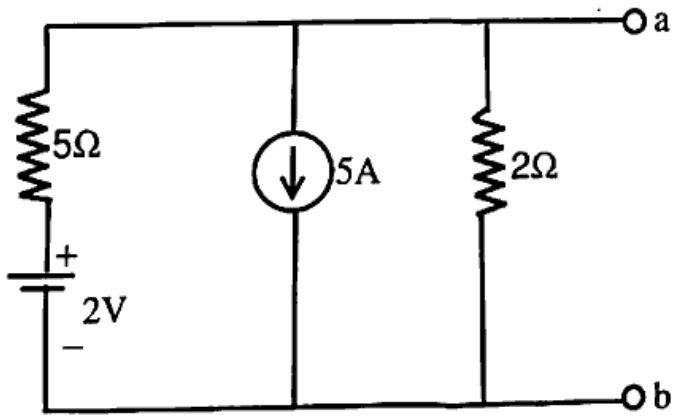
Q.2 (a) State Thevenin's theorem. Also write the steps for solving a network using Thevenin's theorem. [8]

(b) Explain Reciprocity theorem with the steps for solving a network. [8]

OR

Q.2 (a) Explain the Compensation theorem with its limitation. [8]

(b) Find the Norton's equivalent circuit across a-b for the network shown as in given figure. [8]



UNIT- III

Q.3 (a) What is the relationship between line and phase voltages and currents in a star connection? [8]

(b) Write short note on- [4×2=8]

(i) Power factor

(ii) Apparent power

(iii) Reactive power

(iv) Power Triangle

OR

Q.3 (a) A 3 phase load has a resistance of 10Ω in each phase and is connected in (i) Star and (ii) Delta against a 400V three phase supply. Compare the power consumed in both the cases. [8]

(b) A Voltage $V(t) = 150 \sin 10^3 t$ is applied a series RLC Circuit where, $R = 40\Omega$, $L = 0.13H$, $C = 10\mu F$. [8]

Find-

(i) The power supplied by the source

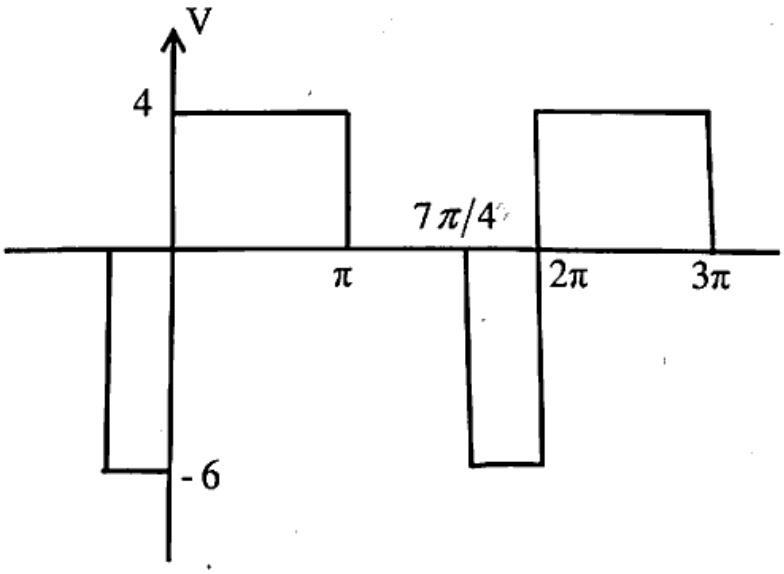
(ii) The reactive power supplied by the source

(iii) The reactive power of the capacitor

(iv) The reactive power of the inductor

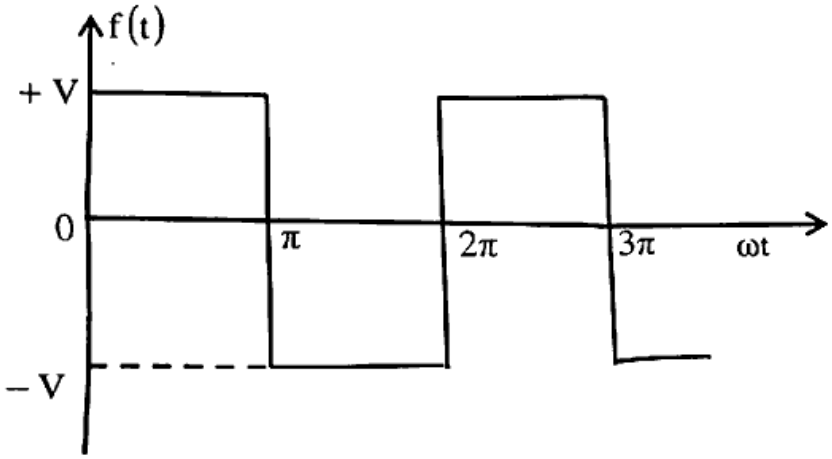
UNIT- IV

Q.4 (a) Find a and b coefficient of Fourier series of the given waveform. [16]



OR

Q.4 (a) Obtain the exponential Fourier series of the waveform given as. [8]



(b) Write short note on Symmetry in Fourier series. [8]

UNIT- V

Q.5 (a) Explain the step response of R-L network. [8]

(b) Explain the initial value and final value theorem. [8]

OR

Q.5 (a) An impulse function is given by $\delta(t - t_1)$. Obtain its Laplace transform. [8]

(b) A function, in Laplace domain is given by- [8]

$$F(s) = \frac{2}{s} - \frac{1}{s+3}$$

Obtain its value by Final value theorem in t domain.
