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.*

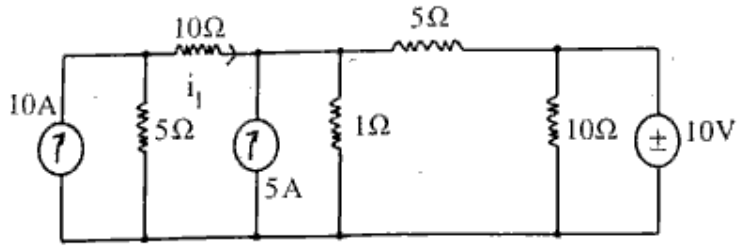
Units of quantities used/calculated must be stated clearly.

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

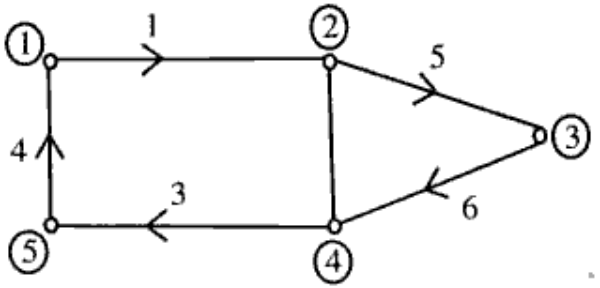
1. NIL 2. NIL

UNIT-I

Q.1 (a) Obtain the current I_1, using KVL. [8

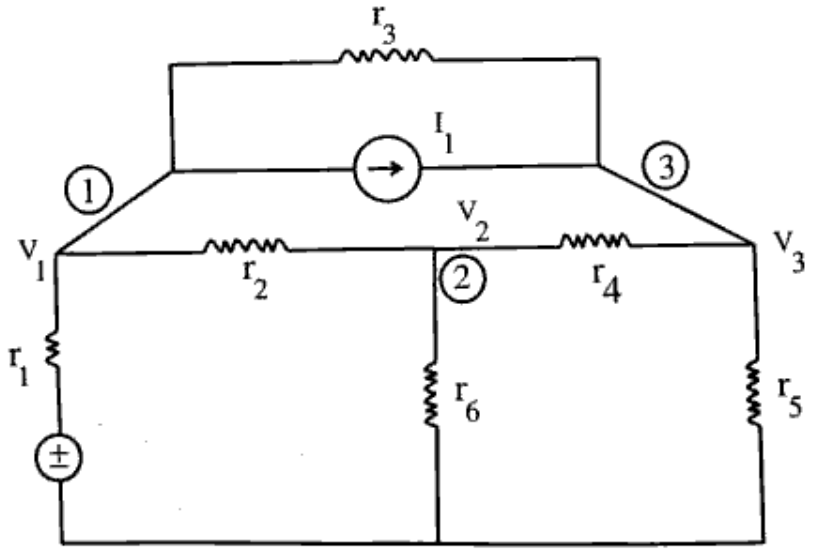


(b) Show the cut-sets for the graph of the network shown in figure and develop the fundamental cut-set matrix. [8]

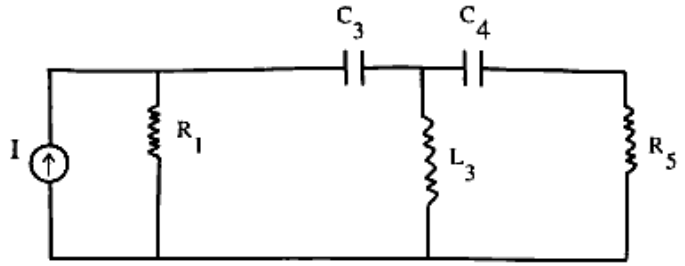


OR

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



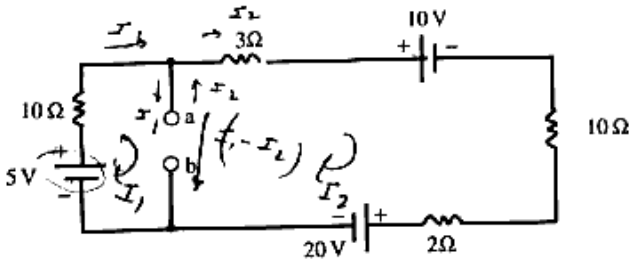
(b) Draw the dual of the network shown in figure. [8]



UNIT-II

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

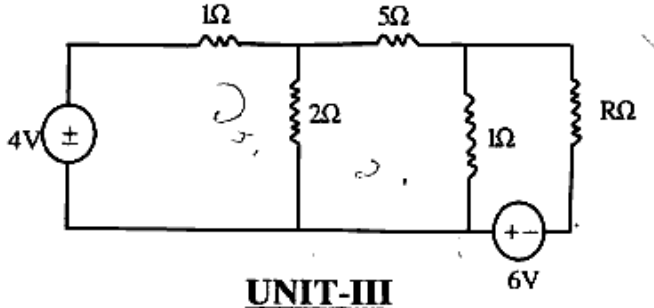
(b) Using Superposition Theorem, find the current through a link that is to be connected between terminals a - b. Assume the link resistance to be zero. [8]



OR

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

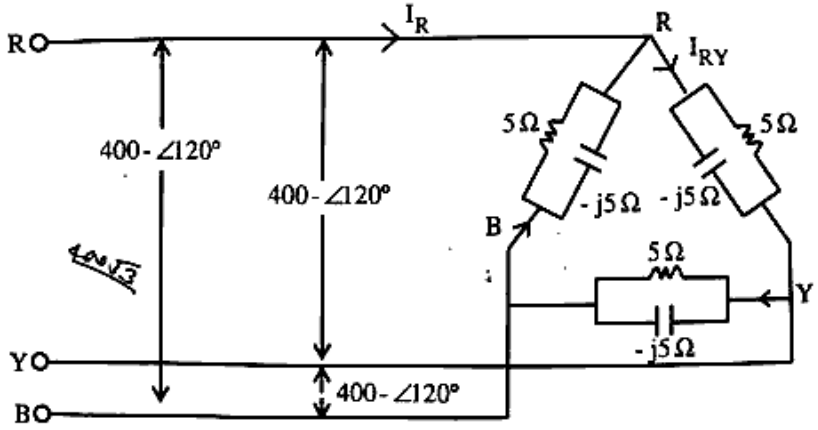
(b) Find the value of R in the circuit of figure, such that maximum power transfer takes place. What is the amount of this power? [8]



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 (5Ω) and capacitance reactance (-j5Ω) 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]

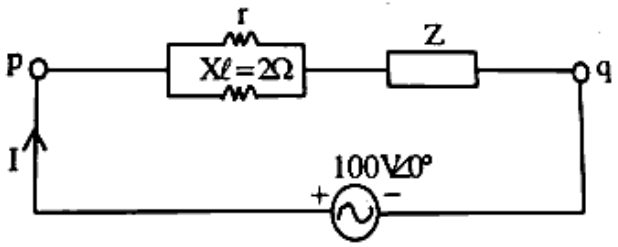
(i) Power Factor

(ii) Reactive Power

(iii) Apparent Power

(iv) Power Triangle

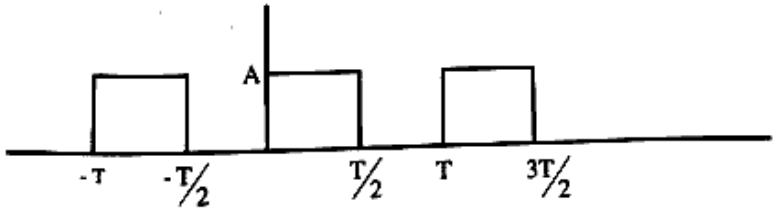
(b) A voltage of $100\angle 0°$ volts is applied across p-q terminals of the circuit shown in figure to produce current of $40\angle 10°$A. Find the value of Z, when r = 5Ω. What would be the active power consumed in Z? [8]



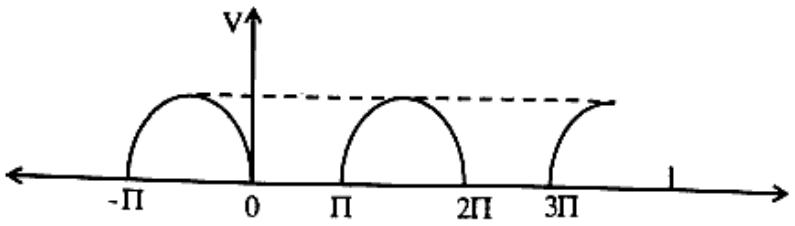
UNIT-IV

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

(a)

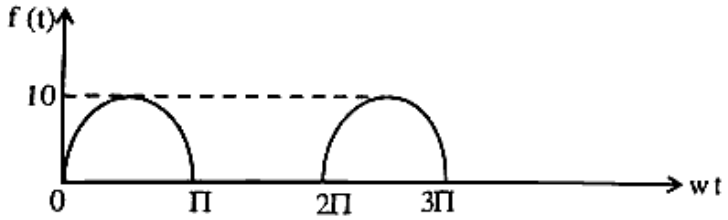


(b)

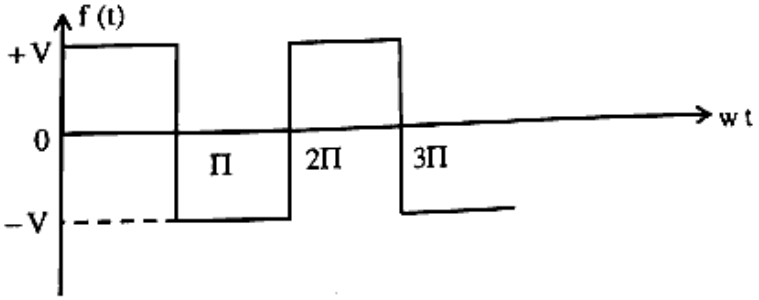


OR

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



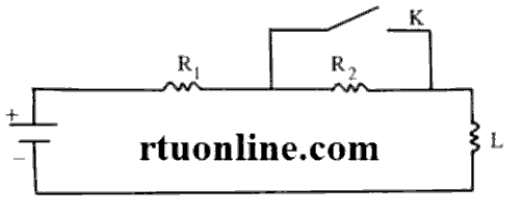
(b) Obtain the Exponential Fourier series of the waveform shown in figure. [8]



UNIT-V

Q.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

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

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