2063
B.E. (Electrical and Electronics Engineering)
Third Semester
ES-EE-301: Network Analysis and Synthesis

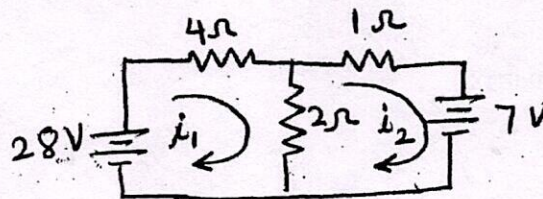Time allowed: 3 Hours　　　　　　　　　　　　　　　　Max. Marks: 50

NOTE: *Attempt* <u>*five*</u> *questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

x-x-x

I.　Attempt the following:-

　　a)　Find the mesh currents of the circuit shown in figure:-

　　b)　With an example, show how by applying Thevenin's theorem, current flowing through a branch of an electrical network can be calculated.

　　c)　The impedance matrix of two part networks are given by $\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix}$ and $\begin{bmatrix} 15 & 5 \\ 5 & 25 \end{bmatrix}$.

　　　　If two networks are connected in series, what is impedance matrix of combination?
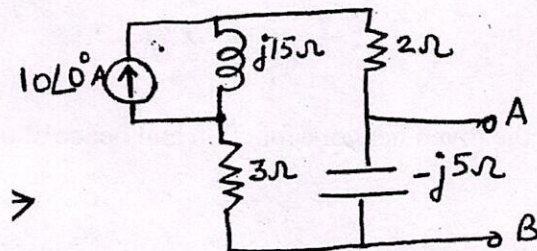
　　d)　Bring out the significance of a Hurwitz polynomial in testing the positive realness of a function.

　　e)　State the advantages offered by the graph theory as applied to electric circuit problems.　　　　　　　　　　　　　　　　　　　　　　　　　(5x2)

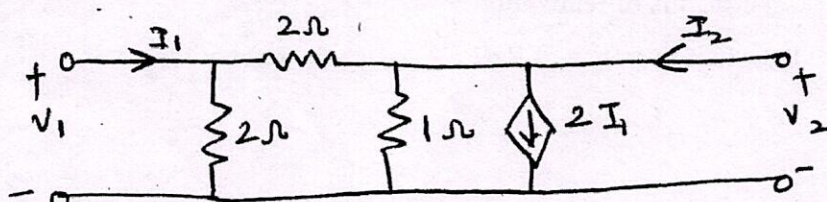### UNIT - I

II.　Obtain Thevenin's equivalent circuit for the figure given as

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(10)

III.　Determine Y and Z parameters for the networks shown as
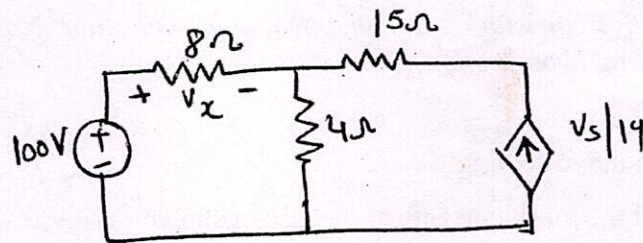

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(10)
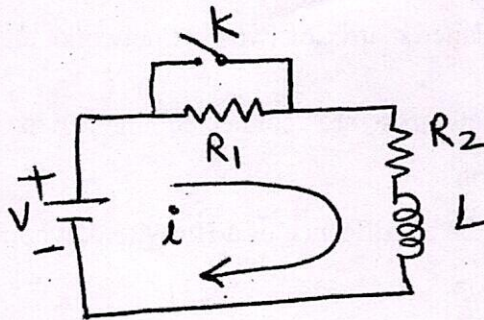
P.T.O.

IV. For the network shown in figure determine:-

a) Tie-set matrix

b) Loop impedance matrix

c) Loop currents   (10)

UNIT - II

V.   In the given circuit shown as

The switch k is closed at t = 0, the steady state condition reached. Obtain the expression for the current in the circuit at time t. If $R_1 = R_2 = 100\Omega$, V = 10V and L = 1H. Calculate at t = 5 ms

(a) Current i

(b) Voltage across R_2 (10)

VI. Draw pole zero diagram for the given network function and hence obtain v(t)

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$ (10)

VII. Write notes on the following:-

a) Cauer forms of realization

b) Transient response of R-C for sinusoidal excitation   (2x5)

x-x-x