

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), 2024

B.Tech, Semester III

Roll No.....

EE1406: Graph Theory and Filter Circuits

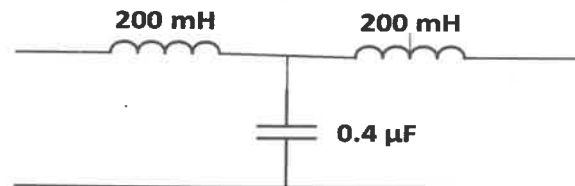
Time: 3 hours

Max. Marks: 40

Instructions to students:

1. Do not write anything other than your roll number on the question paper.
2. Assume suitable data wherever required and mention it.
3. Writing appropriate units, and nomenclature, and drawing neat sketches/schematics/ flow charts wherever required are an integral part of the answer.
4. Use of a Programmable Calculator is not allowed.

- Q.1 For the given low pass constant k-type filter determine the nominal characteristic impedance and the cut-off frequency. Also draw π -section low pass filter. EE1406.2
(06)



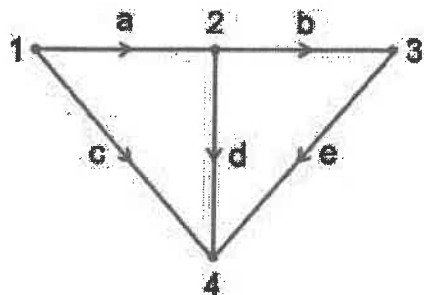
- Q.2 Design k-type pi section high pass filter having nominal characteristic impedance of $R_o = 600 \text{ ohm}$ and cut-off frequency of $f_c = 500 \text{ Hz}$. Also find EE1406.2
(4+2+2)

(a) Attenuation (α) and phase shift (β) at frequency of 600 Hz.

(b) Attenuation (α) and phase shift (β) of 600 Hz.

- Q.3 Design a constant k-type band pass T-section and π -section filter having cut-off frequencies of 1000 Hz and 2000 Hz with the characteristic impedance of 600 ohm. Find the resonant frequency. EE1406.2
(06)

- Q.4 For the network graph below construct the tie set matrix and write equilibrium equations by considering branches a, b, c as tree branches. EE1406.1
(04)



Q.5 The reduced incidence matrix of an oriented graph is

EE1406.1
(08)

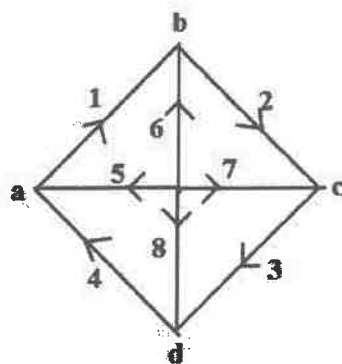
$$A = \begin{bmatrix} 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

- (a) Obtain the incidence matrix
- (b) Draw the graph.
- (c) (b) How many trees are possible for this graph?
- (d)(c) Write cut-set matrices.

Q.6 From the given diagram

EE1406.1
(08)

- (a) Draw the suitable tree.
- (b) Determine number of branches, nodes, links and twigs.
- (c) Obtain the incidence matrix
- (d) Determine the number of possible trees.



all the best!