

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination (Backlog), 2025
B.Tech

Roll No.....

EE1406: Graph Theory and Filter Circuits

Time: 3 hours

Max. Marks: 40

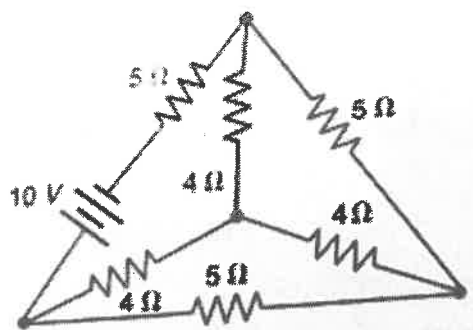
Instructions to students:

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 A low-pass filter is composed of a symmetrical π section. Each series branch is a 0.02 H inductor and shunt branch is a 2 μ F capacitor. Find EE1406.2
(06)
- (a) cut-off frequency
 - (b) nominal impedance
 - (c) characteristic impedance at 200 Hz.
 - (d) attenuation at 2 kHz
 - (e) phase shift constant at 2 kHz.
 - (f) draw T-section of low pass filter
- Q.2 Design k-type pi section high pass filter having nominal characteristic impedance of $R_0 = 500$ ohm and cut-off frequency of $f_c = 1$ kHz. 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 1.2 kHz.
- Q.3 Design a constant k-type band stop T-section filter having cut –off frequencies of 1 kHz and 1.5 kHz with the characteristic impedance of 500 ohm. Find the resonant frequency. EE1406.2
(06)
- Q.4 The reduced incidence matrix of an oriented graph is EE1406.1
(06)
- $$A = \begin{bmatrix} 1 & 0 & 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & 1 & -1 & 0 \\ 0 & 0 & 1 & 0 & 1 & -1 \end{bmatrix}$$
- (a) Obtain the incidence matrix
 - (b) Draw the graph.
 - (c) How many trees are possible for this graph?

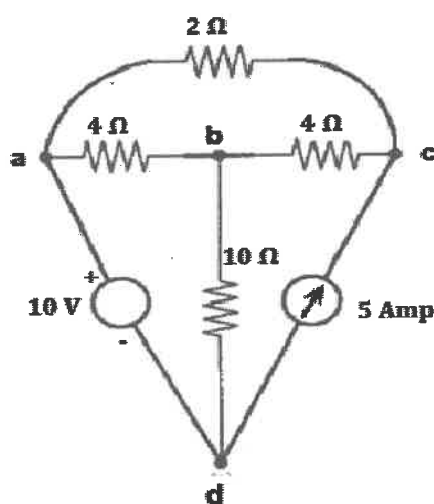
Q.5 Write down the incidence and cut-set matrices for the network shown.

EE1406.1
(06)



Q.6 For the network graph below construct the tie set and cut set matrix and write equilibrium equations by considering branches ab, bc and bd as tree branches.

EE1406.1
(08)



all the best!