Name:

Enrolment No:

UPES

End Semester Examination, December 2023

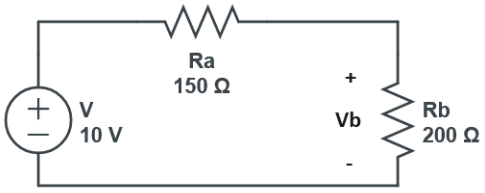
Course: Network Analysis **Semester: III**

Program: B. Tech ECE **Time : 03 hrs.**

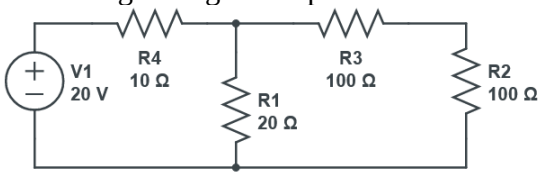
Course Code: ECEG2020 **Max. Marks: 100**

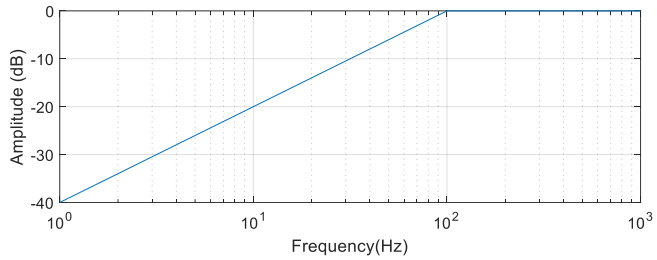
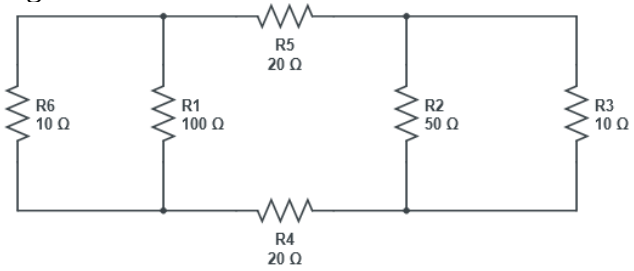
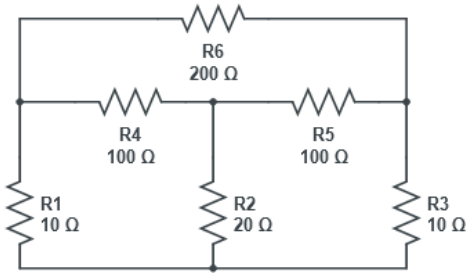
Instructions: Attempt all the questions. Assume any missing data. Read all the instructions carefully

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Define the planer and non-planer graph with suitable example for each.	**4**	**CO3**
Q 2	Determine the maximum power transfer for the Thevenin equivalent network with the given Thevenin voltage (Vth) is 15 V and Thevenin resistance (Rth) is 20 Ω.	**4**	**CO1**
Q 3	Comment on the symmetry and reciprocity characteristics of the provided two-port network based on its given Z parameters. $Z = \begin{bmatrix} 20 & 10 \\ 10 & 15 \end{bmatrix}$	**4**	**CO2**
Q 4	Elaborate on the significance of Laplace transform and inverse Laplace transform in the context of circuit analysis.	**4**	**CO2**
Q 5	Determine the voltage Vb across the resistor Rb for the following circuit. 	**4**	**CO1**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Evaluate the Y parameters of the two-port network with the provided Z parameters. $Z = \begin{bmatrix} 30 & 20 \\ 10 & 10 \end{bmatrix}$	**10**	**CO2**
Q 7	Obtain the current flowing through each passive elements shown below. 	**10**	**CO1**

Q 8	Determine the filter type based on the amplitude and frequency profile. Also obtain the cut-off frequency and slope of the filter.  	**10**	**CO4**
Q 9	Obtain the RLC circuit synthesis based on the cauer form I for given impedance Z(s). $Z(s) = \frac{3s^3+24s^2+36}{s^3+4s}$	**10**	**CO4**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Analyze the following equivalent impedance of the network represented by the following transfer function. $\frac{V(s)}{I(s)} = Z(s) = \frac{s+1}{s+3}$ a) Determine the poles and zeros of the network. b) Comment on the stability of the system. c) For the voltage input v(t) of 10 V. Obtain the equivalent current i(t) flowing out of the voltage source.	**20**	**CO2**
Q 11	Obtain the network graph and incidence matrix for the given electrical network, taking the convention that current flows in the west and north directions and ground node at the southwest corner.  Or Determine the branches, links in co-tree, and cut-set incidence matrix for the provided electrical network, while considering current flow in the west and north directions and incorporating a ground node at the southwest corner.  	**20**	**CO3**