Sub Code: BEET 305 **ROLL NO……..……..**

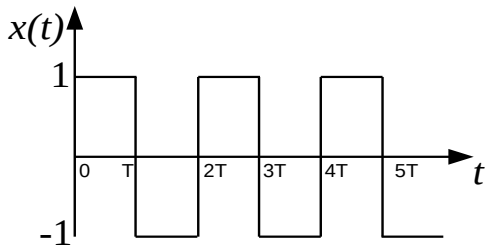
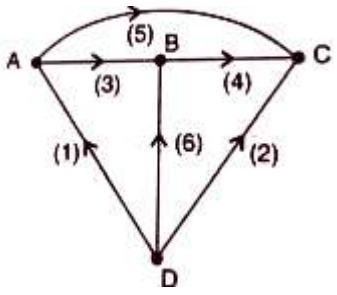
III SEMESTER EXAMINATION, 2022 – 23

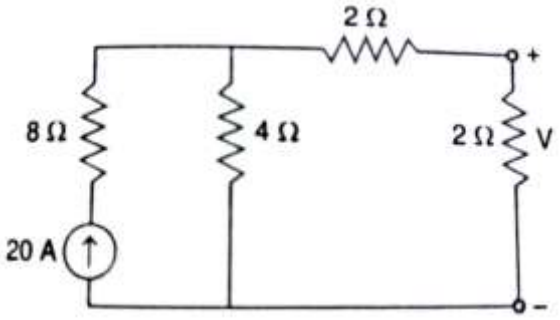
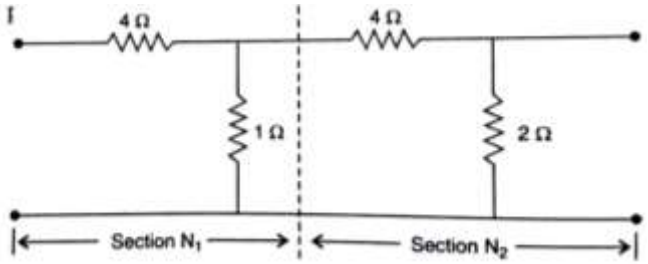
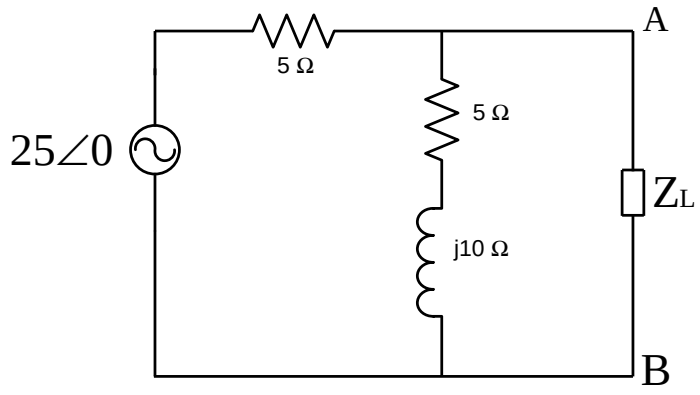
IInd yr B.Tech. – E&CE/EE/E&EE

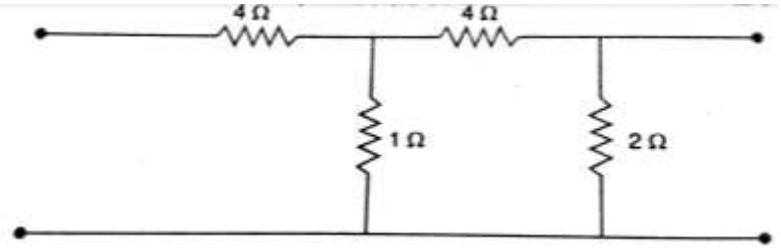
Networks Analysis and Synthesis

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	**Answer any four parts of the following.** a) State and explain Millman's theorem b) What is meant by symmetry in a two-port network? Determine the condition of symmetry in terms of hybrid parameters for a two-port network. c) Define positive real function and mention its properties d) Find the Laplace transform of the periodic waveform  e) For the graph shown in fig select 1,2,3 as twigs of a tree , write the f-loop and f- cutset matrices  f) Describe the singularity function with suitable examples.	**5x4=20**
Q 2.	**Answer any four parts of the following.** a) Draw the directed graph of the incidence matrix given below. Mathematically find out fundamental cutset matrix $A = \begin{bmatrix} 1 & 0 & 0 & -1 & 0 & 1 \\ -1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & -1 & 0 & 0 & 0 \end{bmatrix}$	**5x4=20**

	b) For the circuit shown, verify he reciprocity theorem  c) For the network to be reciprocal show that AD - BC = 1, where A,B,C,D are the Transmission line parameters. d) Find the Laplace transform for the given signal and calculate the ROC. $x(t) = t^2 e^{-3t} u(t)$ e) Write the properties of RL driving point impedance function f) Find the step response of series RL circuit	
Q 3.	**Answer any two parts of the following**. a) Determine T-parameters for cascade connected network shown below  b) Calculate the value of Z_L to be connected across A-B for maximum power transfer and also find power absorbed by Z_L for the circuit given below  c) Determine the term ‘tree’ ‘f-cutset’ and f-loops’ related to linear graph and discuss their properties	**10x2= 20**
Q 4.	**Answer any two parts of the following.** a) Explain the following terms: (i) Tree and co-tree (ii) Node and branch (iii) Twig and Link or chord (iv) Oriented or directed graph (v) Connected and un-connected graph	**10x2= 20**

	b) State and explain Thevenin's theorem and specify the types of circuits to which it is applicable. Also state the theorem which is dual of the above theorem. c) Realize $Y(s) = \frac{(s+1)(s+6)}{(s+2)}$ in Foster- II form.	
Q 5.	**Answer any two parts of the following.** a) Realize $Z(s) = \frac{s^4+7s^2+9}{s^3+4s}$ in Causer-I and II forms b) Determine Z and Y- parameters of the network shown below  c) Find the step response of series RLC circuit.	**10x2= 20**

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