Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination December 2025

Roll no.....

Name of the Course and semester: Electronics & Communication/ 3rd semester
Name of the Paper: Network Theory
Paper Code: TEC -303

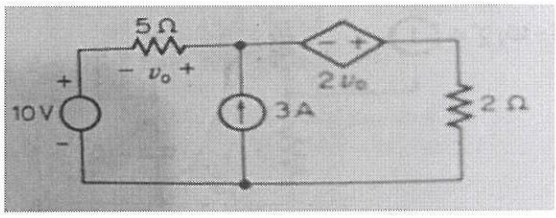
Time: 3 hour Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

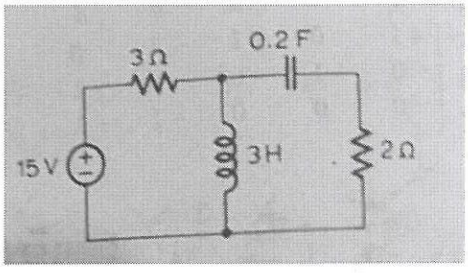
a. State and explain Millmans theorem with suitable example (CO: 1)
b. For the circuit given below find the current in 2 ohm resistor using Nortons theorem. (CO: 2)



c. Illustrate Tellegens theorem and explain it with suitable exam. (CO:1)

Q2. (2X10=20 Marks)

a. Explain the concept of Duality in graph theory also draw the Dual for the Network given below: (CO: 2)



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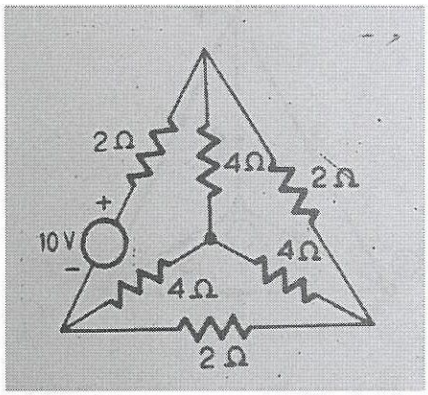
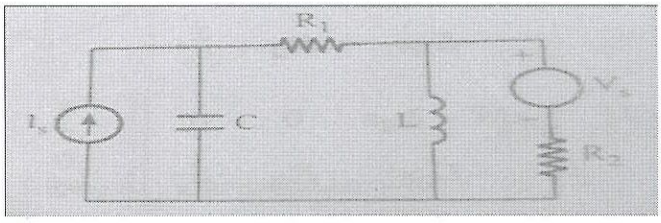
b. For obtain the Tie set matrix for the circuit given below: (CO: 2)



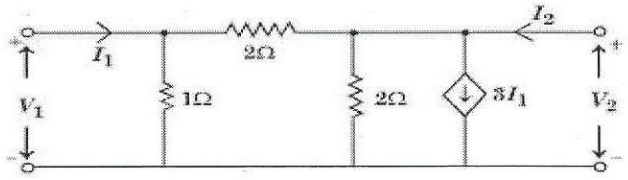
c. Draw the graph of the network shown below. How many trees are possible for this graph? Draw any two of your choice. (CO: 2)



Q3. (2X10=20 Marks)

a. Derive the condition of reciprocity and Symmetry for Y parameters. (CO: 4)
b. Perform the following conversions: (CO: 4)
i) Z to Y parameters
ii) Y to H parameters

c. Find Z parameter for the network shown below: (CO: 4)



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Q4. (2X10=20 Marks)

a. Realize the following RC driving point impedance function in First Foster form:

$$Z(s) = (s^2+6s+8) / (s^2+4s+3)$$ (CO: 5)

b. Obtain Cauer-1 form for the function given by: (CO: 5)

$Z(S) = (6s^3 + 15s) / (s^2 + 2)$

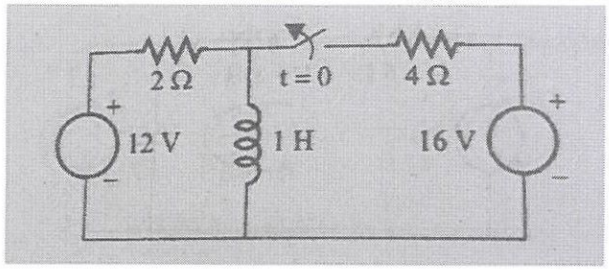
c. Obtain Cauer -II form for :

$Z(S) = (s^4 + 7s^2 + 8) / (3s^3 + 12s)$ (CO: 5)

Q5. (2X10=20 Marks)

a. Define poles and zeros of a transfer function. How do the locations of poles and zeros on the s-plane affect the system's stability and frequency response? (CO: 3)

b. Find i(t) for t>0 in the circuit shown below. Switch is opened at t=0 (CO: 4)



C. Discuss the properties of the following: (C0: 2)

i) Driving Point Function
ii) Transfer function