

**VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA**  
**Odd Mid Semester Examination for Academic Session 2025-26**

COURSE NAME: B.Tech.

SEMESTER: 3rd

BRANCH NAME: ETC

SUBJECT NAME: Network Analysis and Synthesis

FULL MARKS: 30

TIME: 90 Minutes

Answer All Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1. Answer all Questions.

[2 × 3]

- A voltage source  $V$  is connected across the combination of two resistors ( $R\Omega$  each) in parallel. If the resistor values are DOUBLED, the net current will be \_\_\_\_\_.
- Find the final value of  $v(t)$  for  $V(s) = (s+4)/(s^3+3s^2+2s)$ .
- State the condition for reciprocity & symmetry in terms of transmission parameters of a two port Network.

- CO1

- CO2

- CO3

Q2.

[8]

- State and prove maximum power transfer theorem.
- In **Figure 1**,  $R_1 = R_3 = 5\Omega$ ;  $R_2=R_4 = 10\Omega$ ;  $R_5=R_6 = 2\Omega$ ;  $V_1 = 10V$ ;  $V_2 = 20V$ . Using mesh analysis, determine the currents across  $R_2$  and  $R_4$  resistors.

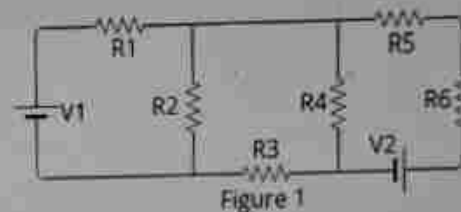


Figure 1

- CO1

OR

- Convert a given DELTA network to its equivalent STAR network. Assume all the resistors of the delta network to be of value  $R\Omega$ .
- In **Figure 1**,  $R_1 = R_2 = 5\Omega$ ;  $R_3=R_4 = 10\Omega$ ;  $R_5=R_6 = 6\Omega$ ;  $V_1 = 10V$ ;  $V_2 = 20V$ . Using nodal analysis, determine the voltage drops across  $R_1$  and  $R_5$  resistors.

- CO1

[8]

Q3.

- CO2

- Calculate the transient current in the series RL circuit for DC excitation.
- Obtain the expression for resonating frequency and bandwidth in a series resonating circuit.

OR

- Calculate the transient current in the series RC circuit for DC excitation.
- Find the current  $i(t)$  in the series R-L circuit having  $R = 10\Omega$  and  $L = 10\text{ H}$ , while a dc voltage of  $100V$  is applied. What is the value of this current after 5sec of switching on?

- CO2

[8]

Q4.

- CO3

- Obtain Y parameters for the circuit shown in **Figure 2**.
- Obtain the condition for reciprocity and symmetry in case of hybrid parameters.

OR

- Obtain hybrid parameters for the circuit shown in **Figure 2**.

- CO3

- Express hybrid Parameters in terms of Z Parameters.

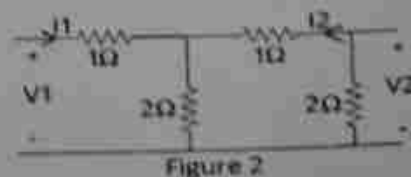


Figure 2