



Mid Sem Exam: Network Analysis and Synthesis (EE 202)
B. Tech (EEE) III Sem

Roll Number:

Date: 29/11/2024

Total Time: 3 Hours

Maximum Marks: 70

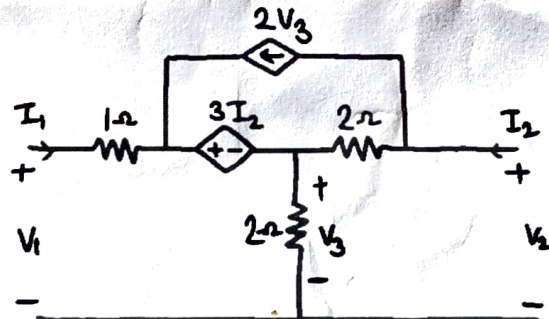
Instructions:

- This question paper consists of 7 questions. Each question is worth 10 Marks.
- Answer all questions; there are no optional questions.
- Assume the appropriate value of any missing data or information and mention it in your answer sheet.
- In case of missing steps/explanation, zero marks will be awarded (even if the final answer is right)
- Use of a calculator is allowed.

1. Find the Foster I and Foster II forms (circuits with component values) of the following impedance function. [5+5]

$$Z(s) = \frac{s(s^2 + 2)}{(s^2 + 1)(s^2 + 3)}$$

2. Find the Z-parameters of the figure shown below. [10]



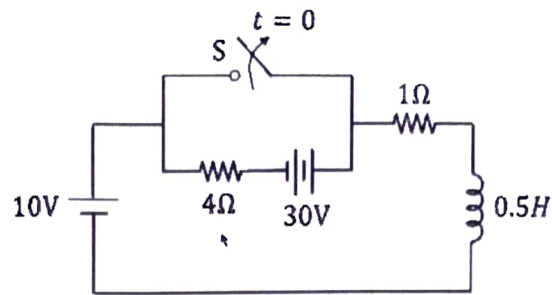
3. Check (show all tests) whether the following functions are positive real or not. [5+5]

(a) $F_1(s) = \frac{s^3 + 5s^2 + 9s + 3}{s^3 + 4s^2 + 7s + 9}$

(b) $F_2(s) = \frac{s^3 + s^2 + 3s + 5}{s^2 + 6s + 8}$

4. In the circuit shown below, the switch 'S' was closed for a very long time and then opened at $t=0$.

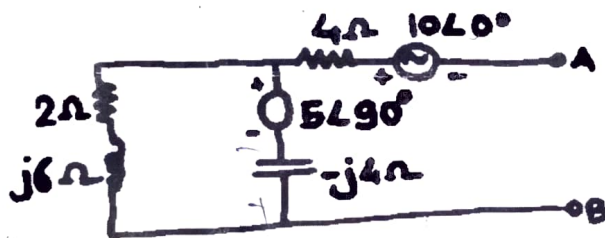
Find expression $i_L(t) = i_L(\infty) + [i_L(0^+) - i_L(\infty)]e^{-\frac{t}{\tau}}$ for $t > 0$



15. Find the Cauer I and Cauer II forms (circuits with component values) of the following impedance function. [5+5]

$$Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$$

16. Find out the Thevenin equivalent across A-B



17. A two-port network is said to satisfy the reciprocity condition, if the excitation and response can be interchanged. In Z-parameter terms, it simply means that $Z_{11} = Z_{22}$. Find out (**with steps**) which condition (in terms of ABCD) parameter is sufficient to say the same. [10]

- (i) $AB + CD = 1$
 (ii) $AD - BC = 1$
 (iii) $AD = BC$