CLASS: BTECH   SEMESTER : III
BRANCH: EEE   SESSION : MO/2024

SUBJECT: EE205 CIRCUIT THEORY

TIME: 3 Hours   FULL MARKS: 50
INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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			CO	BL
Q.1(a)	Define 1) incidence branch 2)cut set	[2+3]	[CO1,	BL1,
	The branch current and loop current relations are expressed in matrix form as:		CO2]	BL2

$$\begin{bmatrix} i_1 \\ i_2 \\ i_3 \\ i_4 \\ i_5 \\ i_6 \\ i_7 \\ i_8 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & -1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \\ I_4 \end{bmatrix}$$

Draw the orientation graph

Q.1(b)   Draw the oriented graph for the circuit shown in figure and write the equilibrium   [5]   [CO1,   BL1,
KVL equation when branch with 1H acting as twig.   CO2]   BL2
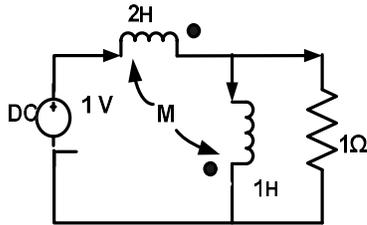
Q.2(a)   Obtain V_0 and establish the reciprocity theorem for the network below.   [5]   [CO1,   BL3,
                                                                                              CO2]   BL4,
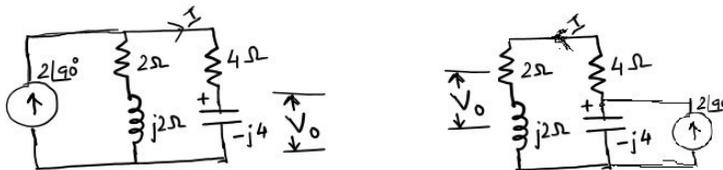
Q.2(b)   Define the state-space and Obtain the State Space Variable model of the system   [5]   [CO1,   BL3,
whose transfer function is as below   CO2]   BL4,

$$T(s) = \frac{5(s+10)}{s^3 + 10s^2 + 20s + 50}$$

Q.3(a) Convert H-Type parameter in terms of z parameters. [5] [CO2, BL3, CO3] BL4,
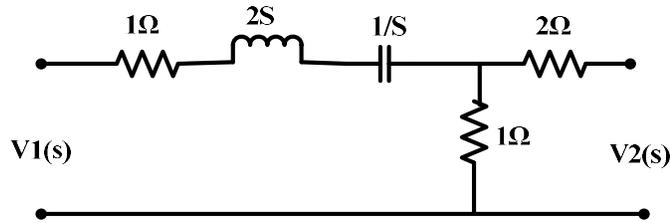
Q.3(b) for the network shown find the Z11(s) and Y11(s) [5] [CO2, BL3, CO3] BL4,

Q.4(a) check positive realness of the function $f(s) = \dfrac{2s^2 + 2s + 1}{s^3 + 2s^2 + s + 2}$ [5] [CO4] BL3

Q.4(b) Synthesize the impedance function using Foster form I [5] [CO4, BL3 CO5]

$$z(s) = \frac{s(s^2 + 10)}{(s^2 + 4)(s^2 + 16)}$$

Q.5(a) Compare Butterworth and Chebyshev approximations. [5] [CO4, BL3 CO5]

Q.5(b) The specification for LP filter are: [5] [CO4, BL3 CO5]

$\alpha_p \leq 1dB$ for $f \leq 2MHz$

$\alpha_s \geq 40dB$ for $f \geq 8MHz$ determine n and t for Butterworth and Chebychev polynomials.

::::::22/11/2024::::::E