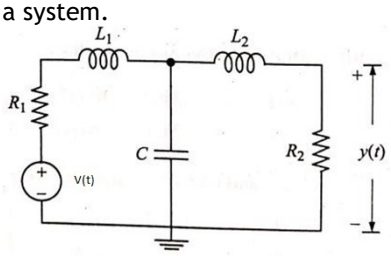
BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS:B Tech **SEMESTER : VII**
BRANCH: EEE **SESSION : MO/2025**

SUBJECT: EE439 APPLIED CONTROL THEORY

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Explain the difference between state space and transfer function representation of a system.	[2]	1	2
Q.1(b)	 Find the state space model for the electrical system	[3]	1	123
Q.2(a)	A system represented by the differential equation $\frac{d^3y}{dt^3} + \frac{d^2y}{dt^2} + 6\frac{dy}{dt} + 7y = 2u(t)$ Find the state space model	[2]	1,2	123
Q.2(b)	Find the block diagram representation of the above model	[3]	1,2	123
Q.3(a)	For a system given by $A = \begin{bmatrix} 0 & 5 \\ -1 & -2 \end{bmatrix}$ $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ $C = [1 \quad 1]$ Find a state transition matrix	[2]	1,2,3	124
Q.3(b)	Find the expression for the solution of state variable.	[3]	2.3	12
Q.4(a)	What are the Properties of state transition matrix?	[2]	2	123
Q.4(b)	Find the expression for the Transformation of State Variable.	[3]	2	123
Q.5(a)	A system matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix}$ find the eigen value and comments 5(a)on stability.	[2]	2,3	234
Q.5(b)	Find the Eigen vector of the Question 5(a)	[3]	2.3	23

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