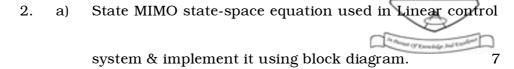
	<u>Origan</u>
Roll N	O.:
Invigil	ator's Signature :
	CS/M.Tech (LT)/SEM-2/MOLT-207/2010
	2010
PRO	CS/M.Tech (LT)/SEM-2/MOLT-207/2010 2010 CCESS CONTROL IN TANNERY OPERATIONS Allotted: 3 Hours The figures in the margin indicate full marks. didates are required to give their answers in their own words as far as practicable. Answer Questions No. 1 & any four from the rest. Answer all the following questions: 10 Process control involves designing of controller & checking its stability for the whole system. True / False 1 What is the difference between transducer and sensor? 2 C) Define 'accuracy' and 'precision' of a measuring instrument. 2 H) How does pH sensor work?
Time A	Allotted: 3 Hours Full Marks: 70
	The figures in the margin indicate full marks.
Cano	•
	Answer Questions No. 1 & any four from the rest.
1. A	answer all the following questions:
а	
	True / False 1
b	,
	Selisor .
C	• •
	instrument. 2
d	How does pH sensor work?
e) Design a temperature measuring system using RTD as
	transducer. 3

[Turn over

30225 (M.Tech)





- b) Find the solution of the state space equation (in homogeneous condition).
- 3. a) Derive an equation for MIMO to SISO conversion. 9
 - b) Convert the SISO transfer function

$$\frac{Y(S)}{U(S)} = \frac{1}{S^2 + 2S + 5}$$
 into its MIMO equivalence. 6

4. a) Determine the eigenvalue of the characteristic matrix

$$A = \left[\begin{array}{cc} 3 & 4 \\ & \\ 2 & 1 \end{array} \right] . 5$$

- b) What is the use of diagonalization of matrix *A*?
- c) How is the diagonalization of matrix *A* carried out? 8

30225 (M.Tech)



- 5. a) What do you understand by the term 'Controllability' & what are the conditions to be satisfied for a system to be controllable?
 - b) Verify whether the following system is controllable or not:

$$\dot{x}_1 = x_1 + x_2 + u$$

$$\dot{x}_2 = 2x_1 - x_2 .$$
5

c) Define observability. State whether the following system is observable or not :

$$\dot{x}_{1} = x_{2}$$

$$\dot{x}_{2} = 2x_{1} - 3x_{2} + u$$

$$y = x_{1} - x_{2}.$$
7

- 8. Write short notes on any *two* of the following : $2 \propto 7\frac{1}{2}$
 - a) A block diagram of process controller development in a leather tanning process
 - b) Flow meter, Humidity & displacement measuring transducer
 - c) Soft sensor.