

Or

- 3 (a) For the state equation

$$\dot{x}(t) = \begin{bmatrix} 0 & 1 & 0 \\ 2 & 0 & 2 \\ -8 & -4 & -3 \end{bmatrix} x(t)$$

Find the other canonical form of Matrix

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- 3 (b) Derive and state the equation for Jordan canonical form

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### Unit-IV

- 4 (a) What is State Transition Matrix ? State and derive the properties of state transition Matrix . 8
- (b) Explain the concept of controllability and observability and compute these in corporate with State transition Matrix. 8

Or

- 4 (a) State and Derive the Ackermari's formula for state equations 8
- 4 (b) State and Derive the equations for pole placement by state feed back with  $n^{\text{th}}$  order state model 8

### Unit-V

- 5 (a) Given

$$Z[x(k)] = x(z)$$

Find the z- transform of

(i)  $Y(k) = \sum_{i=0}^k x(i)$

(ii)  $Y(k) = e^{-ak} x(k)$

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