



Reg. No. :

Name :

**Eighth Semester B.Tech. Degree Examination, April 2016
(2008 Scheme)
08.835 : DISCRETE CONTROL AND NAVIGATION SYSTEMS (T)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions.

1. Discuss the effect of adding poles and zeros to open loop transfer function of a system.
2. What are the advantages and limitation of digital systems ?
3. Derive the transfer function of first order hold.
4. Define Liapunov theorem on asymptotic stability.
5. Obtain the inverse state transition matrix of the following system using Laplace transform method.
$$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -8 & -6 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$
6. Give conditions to be satisfied for pole placement technique.
7. What are different frequency response method ?
8. Explain Doppler speed login system.
9. Why do deep sounding echo sounders operate with low frequency transmission ?
10. What is DGPS ? Mention how it improved fix accuracy ? **(10×4=40 Marks)**



P.T.O.

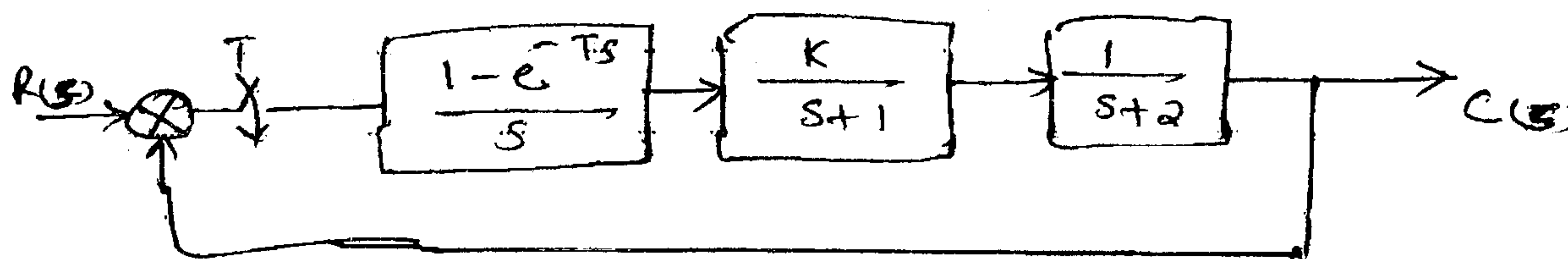


PART – B

Answer **any two** questions from **each** Module.

Module – I

11. Derive pulse transfer function of a digital DID controller.
12. Consider the system and find the transfer function $C(z)/R(z)$. Determine the range of value of k for which the system will be stable.



Where $T = 0.1s$.

13. What are the different methods for transient analysis of the digital controllers and filters ? (2×10=20 Marks)

Module – II

14. Obtain the state space representation of the transfer function.

$$G(s) = \frac{s^2 + 6s + 5}{(s + 1)(s^2 + 3s + 2)}$$

15. Analyse stability by Lyapunov's direct method with a suitable example.
16. Assess the controllability and observability of the following system.

$$A = \begin{bmatrix} 2 & 0 \\ -1 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 1 \\ -1 \end{bmatrix} \quad C = [1 \quad 1] \quad \text{(2×10=20 Marks)}$$

Module – III

17. Explain different speed measurement technique used in navigation system.
18. Explain the technique used in LORAN C receivers. Mention its advantages.
19. Explain the autopilot navigation systems. (2×10=20 Marks)