



Paper id: 251030

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Subject Code: BEE063

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BTECH
(SEM VI) THEORY EXAMINATION 2024-25
DIGITAL CONTROL SYSTEM

TIME: 3 HRS**M.MARKS: 70****Note:** Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief.****02 x 7 = 14**

Q no.	Question	CO	Level
a.	What is PID controller?	1	K3
b.	What is Pulse transfer function?	2	K4
c.	What is bi-linear transformation?	3	K4
d.	What is the mathematical relationship between z transform and Laplace transform	2	K4
e.	Define state transition matrix?	5	K5
f.	What type of stability is measured by using root locus method?	4	K5
g.	What is Characteristic equation of discrete control system?	5	K5

SECTION B**2. Attempt any three of the following:****07 x 3 = 21**

a.	Explain the lifted state-space models in detail?	1	K3
b.	Derive the relationship between discrete state space model and pulse transfer function.	2	K4
c.	State and prove the Nyquist sampling theorem?	4	K5
d.	Explain the system identification techniques for discrete-time models	2	K4
e.	Discuss the stability analysis using bi-linear transformation?	3	K4

SECTION C**3. Attempt any one part of the following:****07 x 1 = 07**

a.	Discuss in brief about the sampling process and data reconstruction.	1	K3
b.	State and explain the Jury stability test? Also explain the various types of canonical forms.	3	K4

4. Attempt any one part of the following:**07 x 1 = 07**

a.	Explain the Lyapunov stability theorem?	5	K5
b.	Design the lead compensator of sampled data control system using Bode plot with relevant example?	4	K5

5. Attempt any one part of the following:**07 x 1 = 07**

a.	Discuss the Controllability and observability with relevant mathematics for the stability analysis of discrete state space models.	5	K5
b.	Develop the root locus-based controller of sampled data control system?	4	K5

6. Attempt any one part of the following:**07 x 1 = 07**

a.	Design the lag compensator of sampled data control system using Bode plot with relevant example?	4	K5
b.	Discuss the frequency response analysis for discrete-time systems?	3	K4

7. Attempt any one part of the following:**07 x 1 = 07**

a.	Estimate the time response parameters of a prototype second order system?	3	K4
b.	Explain the robust control techniques for discrete-time systems	4	K5