

POLYTECHNIC, B.E/B.TECH, M.E/M.TECH, MBA, MCA & SCHOOL

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Reg. No. :

Question Paper Code : 90752

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Sixth Semester

Instrumentation and Control Engineering

IC 8651 — ADVANCED CONTROL SYSTEM

(Common to : Electrical and Electronics Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

Define state vector.

What does state space become for a second order system?

When is the perfect model following achieved in pole placement?

Write the key problem in applying pole placement.

Compare absolute stability and relative stability.

State the Nyquist stability criterion.

Write the uniqueness of limit cycle.

Compare phase-plane analysis and describing-function analysis.

Define the term LQ regulator stability.

List the applications of gain scheduling approaches in process control.

PART B — (5 × 13 = 65 marks)

(a) Explain the concept of the state of the system.

Or

(b) Explain the state space representation of electrical network.

(b) Explain the state space representation for the transfer function.

Or

16. (a) How do you solve a homogeneous state equation using infinite method?

PART C — (1 x 15 = 15 marks)

(b) Explain the relation between steady state error and static constants.

Or

15. (a) Explain the linear quadratic Gaussian regulator with loop recovery.

(b) Apply phase plane method to study second order nonlinear system.

Or

14. (a) Explain the Isocline method for the construction of phase trajectories.

(b) Apply discrete Kalman Filter to analyze discrete linear dynamic systems.

Or

13. (a) Explain the types of compensation.

(b) Distinguish between full state feedback H₂ control and output feedback H₂ control.

Or

12. (a) How do you improve the stability by state feedback?