Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech. Winter 2017 - 18 Examination

Semester: 1 **Date: 02/01/2018**

Subject Code: 03203104 **Time: 2:00 pm to 04:30 pm**

Subject Name: System Identification & Control **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Write the differences between first principle model and empirical model. **(05)**

B) Explain Lyapunov stability with suitable example. **(05)**

C) Draw the block diagram of gain scheduling and explain about it. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) A model characterized by y=mx+c is a linear or nonlinear model. Verify it.

B) Derive the formula for straight-line curve fitting using least square estimation.

C) Explain about Maximum Likelihood approach of parameter estimation.

D) Write the differences between parametric and non-parametric model.

Q.3 A) What is System Identification and explain the different methods of System Identification? **(07)**

B) Derive the formula for Non Recursive least square parameter estimation (ŷ) of the expression Ay=b. **(08)**

OR

B) Draw the block diagram for pole placement control design and find the gain matrix for the system $\dot{x} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ to have the desired location of poles to be at $s = -1$ and $s = -5$. **(08)**

Q.4 A) Differentiate between Direct and Indirect adaptive control. **(07)**

OR

A) Write the procedure of System Identification and explain each step briefly. **(07)**

B) Differentiate between stochastic and deterministic model **(08)**