MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B. TECH (ELECTRONICS AND INSTRUMENTATION)
PROCTORED ONLINE END SEMESTER EXAMINATION Dec. 21/Jan. 22
SUBJECT: NONLINEAR CONTROL SYSTEMS (ICE 4052)
TIME: 9.20 – 10.35 AM **DATE: 24-12-2021** **MAX MARKS 20**

Note: Answer All questions.

1	A	With an example explain the linearization procedure using two-point method. Differentiate between tangent method and secant method.	5 M
	B	Describe the concept and algorithm of input-state linearization for the nonlinear system shown below. $$\dot{x}_1 = a\sin x_2$$ $$\dot{x}_2 = -x_1^2 + u$$ $$y = x_2$$	3 M
	C	Draw and explain the block diagram for input-state linearization	2M
2	A	Design a back stepping controller for the nonlinear system represented as, $$\dot{x}_1 = x_1^2 + x_2, \quad \dot{x}_2 = x_3, \quad \dot{x}_3 = u$$	5 M
	B	With relevant example explain the aim of sliding mode controller.	3 M
	C	Explain the steps in Lyapunov based controller design.	2 M