UNIT–II
CONTROL SYSTEM (23EE503

S.No		Questions	BT	CO	PO
Part–A(ShortAnswerQuestions)					
1		Define a control system.	L1	CO2	PO1
2		Give two examples of industrial control systems.	L1	CO2	PO1
3		What is meant by a mathematical model of a physical system?	L1	CO2	PO1
4		Define transfer function.	L1	CO2	PO1
5		What are the assumptions made in obtaining a transfer function?	L1	CO2	PO1
6		What is a Linear Time-Invariant (LTI) system?	L1	CO2	PO1
7		Distinguish between open-loop and closed-loop control systems.	L1	CO2	PO1
8		What is feedback in a control system?	L1	CO2	PO1
9		State any two advantages of negative feedback.	L1	CO2	PO1
10		What is Mason's Gain Formula?	L1	CO2	PO1
Part – B (Long Answer Questions)					
11	a)	Explain various industrial control system examples and discuss their applications in process industries, manufacturing, and automation.	L2	CO2	PO2
	b)	Describe the procedure for developing mathematical models of physical systems. Illustrate with suitable examples.	L2	CO2	PO2
12	a)	Derive the mathematical model of a mechanical translational system and obtain its transfer function.	L2	CO2	PO2
	b)	Derive the mathematical model of a mechanical rotational system and explain its dynamic behavior.	L2	CO2	PO2
13	a)	Explain the concept of transfer function. Derive the transfer function of a Linear Time-Invariant (LTI) system and discuss its properties.	L3	CO2	PO2
	b)	Compare open-loop and closed-loop control systems with neat block diagrams. Discuss their advantages, disadvantages, and applications.	L2	CO2	PO2
14	a)	Explain the benefits of feedback in control systems. Discuss its effects on stability, sensitivity, disturbance rejection, and bandwidth.	L4	CO2	PO2
	b)	Explain the rules of block diagram algebra. Reduce a complex block diagram and obtain the overall transfer function.	L2	CO2	PO2

15	a)	Define a Signal Flow Graph (SFG). Explain its elements such as nodes, branches, forward paths, loops, and non-touching loops with examples.	L2	CO2	PO2
	b)	State and explain Mason's Gain Formula. Derive the overall transfer function of a system using Mason's Gain Formula and a suitable signal flow graph example.	L2	CO2	PO2