SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai
Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &
Accredited by NBA (B.E - CSE, EEE, ECE, Mech & B.Tech.IT)
COIMBATORE-641 035, TAMIL NADU

Reg. No: | | | | | | | | | | | |

A

B.E/B.Tech - Internal Assessment - III
Academic Year 2024-2025 (Even Semester)
Fourth Semester
Biomedical Engineering
23BMT205 – Biocontrol System

Time: $1^{1/2}$ Hours **Maximum Marks: 50**

Answer All Questions

				Bloom's Level	CO	Industry / GATE
	PART – A (5*2=10 Marks)					
1.	Differentiate distributed parameter and lumped parameter models.			APP	CO4	
2.	Illustrate the physiological role of the pulmonary-cardiovascular interaction during stress.			UND	CO4	GATE 2023
3.	How is negative feedback embedded in physiological system?			UND	CO5	
4.	Infer the use of frequency response in evaluating baroreceptor-mediated circulatory control.			APP	CO5	GATE 2022
5.	Draw the Block diagram of neuromuscular reflex model.			UND	CO5	
	PART – B (2*13=26 Marks)					
				Bloom's Level	CO	Industry / GATE
6.	(a)	Develop a lumped parameter model of the cardiovascular system and explain with relevant equations.	13	ANA	CO4	
		(OR)				
	(b)	Propose a system using physiological models to regulate glucose in an ICU setting. Evaluate its response to patient variability.	13	ANA	CO4	
7.	(a)	Design a feedback control system for the muscle stretch reflex and explain its potential applications in developing adaptive rehabilitation devices.	13	ANA	CO5	GE
		(OR)				
	(b)	Analyze the stability and response behavior of the Pupillary light reflex system under sudden changes in ambient lighting, with relevance to ophthalmic device calibration.	13	ANA	CO5	GATE 2021

PART – C (1*14=14 Marks)

					Bloom's Level	CO	Industry / GATE
8.	(a)	(i)	Formulate a simplified model integrating pulmonary and cardiovascular systems during mild exercise.	7	ANA	CO4	
		(ii)	Apply transient response analysis to a neuromuscular reflex model and explain in detail.	7	ANA	CO5	
		(OR)					
	(b)	(i)	Analyze the regulatory mechanisms affecting cardiac output in	7	ANA	CO4	

			different pathological states.				
		(ii)	Evaluate the frequency response of circulatory control models and their implications in heart rate variability analysis.	7	ANA	CO5	

Bloom's Taxonomy: **REM** – Remember **UND** – Understand **APP** – Apply **ANA** – Analyze **EVA -** Evaluate **CRT -** Create