

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2026***Sixth Semester**Chemical Engineering***CH3651 – PROCESS DYNAMICS AND CONTROL****(Log-log and Semi log graph sheets to be supplied)****Regulations –2021****Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	Specify any two prime reasons for incorporating control in process industries.	L2	1	2
2.	List the different forcing function.	L1	1	2
3.	Name different type of inputs available for the manipulating variable.	L1	2	2
4.	Mention the applications of 'half rule'.	L1	2	2
5.	Distinguish between servo and regulator mechanism problem.	L2	3	2
6.	Compare pneumatic controller with electronic controller.	L2	3	2
7.	Spell out the methods available to study the frequency response of closed loop system.	L2	4	2
8.	State Bode stability criterion. When it cannot be used?	L1	4	2
9.	Write the principle of cascade control system.	L1	5	2
10.	Provide any two applications of ratio control in chemical industries.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a (i) Solve the following by Laplace transforms $\frac{d^2x}{dt^2} + x = \sin t$ (ii) Invert the following $\frac{1}{s(s^2 - 2s + 5)}$	L2	1	16
	Or			
	b A process of unknown transfer function is subjected to a unit – impulse input. The output of the process is measured accurately and is found to be represented by the function $y(t) = t e^{-t}$. Determine the unit step response of the process.	L2	1	16
12.	a Derive the transfer function for the first order system and develop the response equation for step input.	L2	2	16
	Or			
	b Discuss the following: (i) Linearization of non linear system (ii) Transportation lag	L2	2	16
13.	a Explain the working principle of pneumatic controller and final control element with a neat sketch.	L2	3	16
	Or			
	b Explain the method of plotting the Root – Locus diagram for negative feedback systems.	L2	3	16

14.	a	Plot the bode diagram for the control system that might represent PD control of two tanks in series. The open loop transfer function is $G(s) = \frac{0.5s+1}{(s+1)(0.1s+1)}$.	L3	4	16
		Or			
	b	A control loop contains first order lags with time constants 10, 30 and 60 secs. Plot the open loop Nyquist diagram and calculate the value of K_c to give gain margin of 2. Only proportional controller is used in the loop.	L3	4	16
15.	a	Explain the working principle of cascade control with schematic representation and list the application of cascade control for various processes.	L2	5	16
		Or			
	b	Explain the different schemes for the composition control of a distillation column.	L2	5	16
