UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination (Online Mode)

Course: Process Dynamics and Control   **Semester: V**
Program: B. Tech APE GAS   **Time: 03 hrs.**
Course Code: CHEG   **Max. Marks: 100**

Instructions:

SECTION A [60 marks]

Each Question will carry 5 Marks

S. No.		Marks	CO
Q 1	List the objectives of chemical process control.	10	CO5
Q2	What are the various forcing functions used to study the dynamic response of a system? Explain with neat sketches	10	CO5
Q3	Derive the transfer function of two interacting liquid level tanks connected in series	10	CO1
Q4	Determine the range of K for stability of the system with following characteristic equation $s^4+Ks^3+s^2+s+1 = 0$	10	CO2
Q5	Derive the transfer function for the second order system.	10	CO3
Q6	Describe overshoot, decay ratio, first order system, rise time and critically damped system.	10	CO4

SECTION-B [40 marks]

Each Question carries 20 Marks.

Q 7	Differentiate between feedbacks and feed forward control strategies. Develop a feedback control and feed forward control systems for controlling the temperature of liquid inside the stirred tank, which is heated by steam passing through the steam coil immersed inside the tank. Identify different variables involved in the process.	20	CO5
Q 8	Consider a second order system with the following transfer function? G(s) = $\frac{Y(s)}{X(s)} = \frac{1}{s^2+s+1}$ Introduce a step change of magnitude one into the system and find (i) % overshoot, (ii) decay ratio, (iii) ultimate value of Y(t), (iv) Period of oscillation.	20	CO2