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

FIFTH SEMESTER B. TECH (ELECTRONICS AND INSTRUMENTATION)
PROCTORED ONLINE END SEMESTER EXAMINATION Dec. 21/Jan. 22
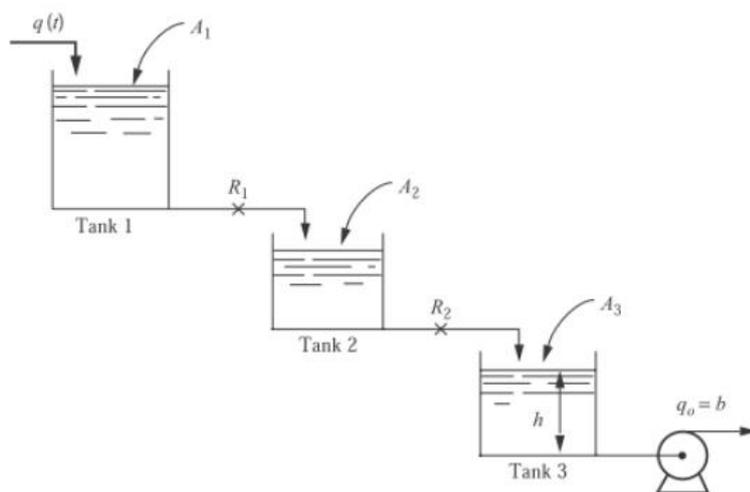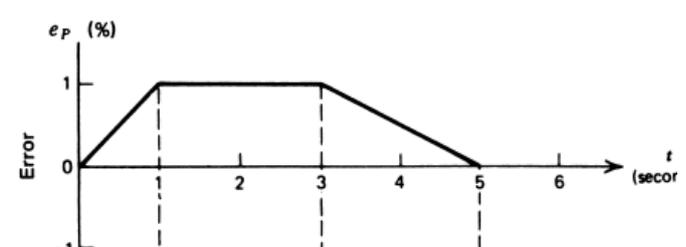SUBJECT: PROCESS INSTRUMENTATION & CONTROL [ICE 3154]
TIME: 75 minutes   DATE: 30-12-2021   MAX.MARKS:20

Instructions to candidates
• Answer **ALL** questions.
• Missing data may be suitably assumed.

1A	Determine the transfer function $H(s)/Q(s)$ for the liquid-level system shown in Fig.Q-1.A. Resistances R_1 and R_2 are linear. The flow rate from tank 3 is maintained constant at 'b' by means of a pump.	5M
1B	For an interacting MIMO system, analyze the pairing with RGA analysis. Also, explain the calculations for Lamda elements in RGA	3M
1C	Derive for a mathematical model of a thermal system with inputs from heater as well as feed.	2M
2A	Suppose the error in Fig.Q-2.A, is applied to a PID controller with $K_P = 5$, $K_i = 2.2\text{sec}^{-1}$, $K_D = 0.5$ s, and $P_o = 20\%$. Draw the graph of the resulting controller output. P.	5M
2B	With a case study of CSTR design a dynamic feed-forward controller with necessary diagrams	3M
2C	Using Taylor series approximation identify the model of a single tank system.	2M

ICE 3106