Reg.No. _____

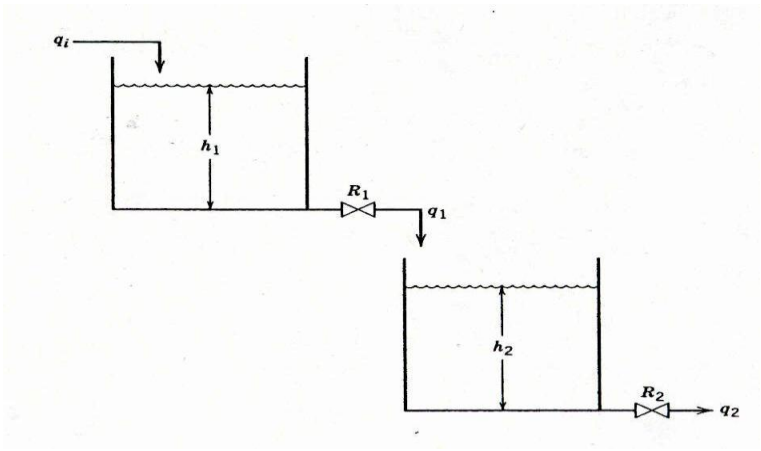
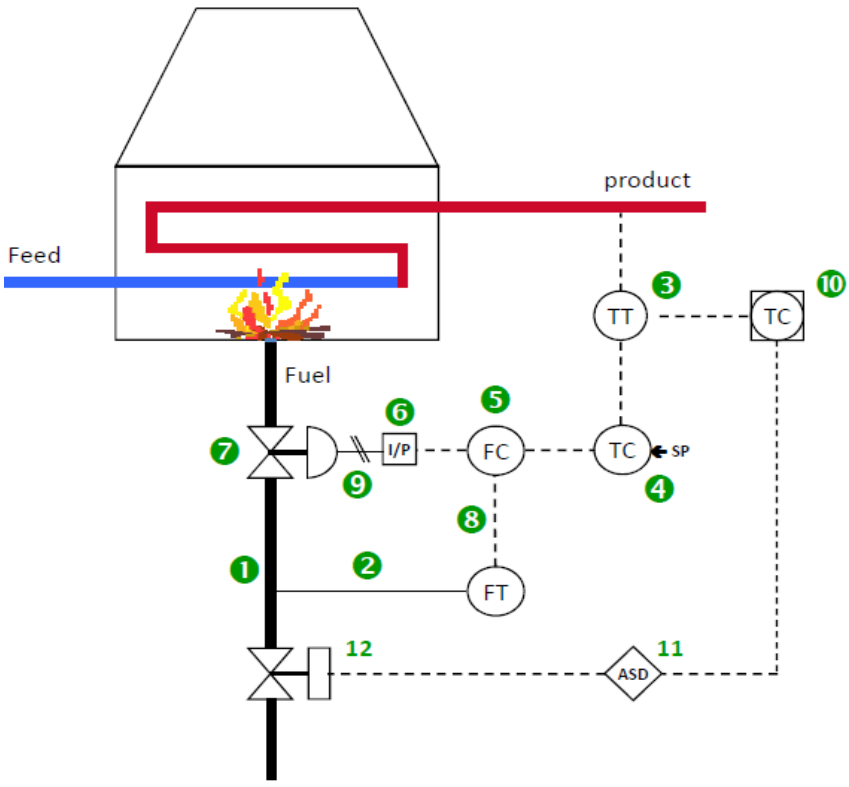
Karunya UNIVERSITY

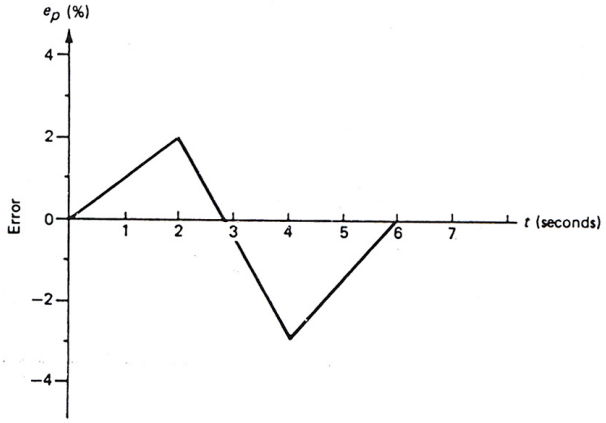
(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : **14EI3003** **Semester** : **2016-17 ODD**
Sub. Name : **Advanced Process Control** **Duration** : **3hrs**
Max. marks : **100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Obtain the mathematical model for two non interacting tanks shown below. 	CO1	10
	b.	List the P & ID symbols shown in figure and explain the process. 	CO1	10

		(OR)		
2.	a.	Reason out why derivative mode of control cannot be used alone.	CO1	2
	b.	A proportional controller has a gain of Kp = 2.0 and Po = 50%. Plot the controller output for the error given by Fig.1. 	CO1	10
	c.	Mention the characteristics of the controller employed in Iron Box.	CO1	4
	d.	List the characteristics of floating mode of control.	CO1	4
3.	a.	Design a controller which utilizes more than one measurement and one manipulation for CSTR.	CO2	10
	b.	Compare and contrast the features of feedback and feedforward controller.	CO2	10
		(OR)		
4.	a.	What are the factors to be considered for the selection of control valves?	CO2	5
	b.	b) Draw the inherent characteristics of control valves and explain.	CO2	5
	c.	c) What is meant by One quarter decay ratio?	CO2	3
	d.	d) Explain the concept of Ziegler Nichol's tuning method.	CO2	7
5.	a.	Explain the characteristics of PI controller.	CO2	10
	b.	What is the main problem caused by PI controller? How to overcome this?	CO2	10
		(OR)		
6.	a.	Explain the concept of Relative gain Array and the selection of loops.	CO3	10
	b.	Consider a process with the following input-output relationships: $y_1 = \frac{1}{s+1} m_1 + \frac{1}{0.1s+1} m_2$ $y_2 = \frac{-0.2}{0.5s+1} m_1 + \frac{0.8}{s+1} m_2$ Compute the relative gains.	CO3	10
7.	a.	Narrate how the type of controllers are selected for various processes.	CO3	6
	b.	Which is the controller which employs one measuremen and more than one manipulated variable?. Elaborate the concept for the control of Pressure in a Steam Header.	CO2	7
	c.	With the block diagram, explain the two configurations of ratio control for flow control applications.	CO2	7
		(OR)		

8.	a.	Draw the general block diagram of an adaptive control.	CO3	2
	b.	Design a Model reference Adaptive Controller using MIT rule.	CO3	18
		Compulsory:		
9.	a.	Explain the concept of interaction in a Stirred Tank Reactor.	CO3	5
	b.	Design an Internal Model Controller.	CO2	15

ALL THE BEST