

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 2

B. Tech  
CPCH 7305 (Old)

**Sixth Semester (Back) Examination – 2013**

**PROCESS DYNAMICS AND CONTROL**

**BRANCH : CHEM**

**QUESTION CODE : B374**

**Full Marks – 70**

**Time : 3 Hours**

*Answer Question No. 1 which is compulsory and any **five** from the rest.  
The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
- (a) Define time constant.
  - (b) Differentiate between servo and regulatory problem.
  - (c) Define offset.
  - (d) What do you mean by tuning of controller ?
  - (e) Write the characteristics of a first order system.
  - (f) What do you mean by transient response ?
  - (g) Write the objectives of a controller.
  - (h) What is transportation lag ?
  - (i) Write the Bode stability criteria.
  - (j) Write the function of sampling switch and hold element.
2. (a) Prove that single tank system is a first order instrument. 8
- (b) What is a pure capacitance system ? 2

**P.T.O.**

3. Write the procedure for Routh stability method. 10
4. Derive the step response equation of a first order system for both step and linear input of magnitude 1. 10
5. Draw the Bode plot for the following : 10
- (a) PD Controller
  - (b) PI Controller
  - (c) PID controller
  - (d) First order system
  - (e) Two non-interacting tank system.
6. (a) Explain the working principle of a pneumatic control valve with a neat diagram. 6
- (b) Prove that the offset for regulatory problem with a PID controller is "0". 4
7. Draw the cascade control configuration of a distillation column. Draw the corresponding block diagram indicating Primary and secondary controller. 10
8. Write short notes on any **two** of the following : 5×2
- (a) Frequency response analysis
  - (b) Root locus method
  - (c) Ratio Controller
  - (d) Sampling.

