

B.TECH. SEM -VII (CHEMICAL 2014 COURSE (CBCS) :

SUMMER - 2018

SUBJECT: PROCESS DYNAMICS AND CONTROL

Day : **Thursday**
Date : **24/05/2018**

S-2018-2468

Time: **02.30 PM TO 05.30 PM**
Max Marks: **60**

N.B.:

- 1) All questions are **COMPULSORY**
- 2) Figures to right indicate **FULL** marks
- 3) Use of non programmable calculator is **ALLOWED**
- 4) Assume suitable data if necessary

Q.1 a) A thermometer is given the impulse change of magnitude 20. The time constant of thermometer is 6 seconds. Sketch the response of thermometer assuming that it is first order system **(06)**

b) Derive response equation of first order system for impulse input **(04)**

OR

a) Derive response equation of first order system for step input **(04)**

b) A thermometer of time constant 15 seconds, initially at 30°C, is suddenly immersed in to a water bath at 100°C. How long will it take for the thermometer reading to reach 90°C? **(06)**

Q.2 Discuss the over damped, critically damped and under damped responses of second order system. Identify their distinguishing characteristics. **(10)**

OR

Illustrate linearization of non linear system with example **(10)**

Q.3 Describe regulator mechanism control problem for proportional controller **(10)**

OR

The set point of control system is given a step change of 0.2 unit, determine offset **(10)**

$$G_p = \frac{3}{(S+1)(3S+1)}$$

$$G_c = 2.4$$

Q.4 Draw root locus diagram for the closed loop system. Where **(10)**

$$G_p = \frac{1}{3(S+1)(S+3)}$$

$$G_c = K_c(1+2S)$$

OR

Define stability, discuss terms of Routh test. Give its limitations. **(10)**

Q.5 Plot Bode diagram for **(10)**

- i) Proportional Controller
- ii) Proportional Derivative Controller

OR

a) Give cohen coon setting for P, PI & PID controller. **(04)**

b) Find the cohen coon setting for the following **(06)**

$$G_p = \frac{10 e^{-2.5 S}}{20 S + 1}$$

Q.6 Describe DCS in detail with diagram. **(10)**

OR

Explain cascade control system with example. **(10)**

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