B.Tech. SEM -VII (Chemical 2014 Course (CBCS) : SUMMER - 2019

SUBJECT: PROCESS DYNAMICS AND CONTROL

Day: Tuesday
Date: 14/05/2019

S-2019-2788

Time: 02.30 PM TO 05.30 PM
Max Marks. 60

N.B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data, if necessary.

Q.1 Derive response equation for mercury thermometer. **(10)**

OR

Q.1 A thermometer having time constant 5 second and showing 80^0 F is immersed in a hot bath at 100^0F. **(10)**

i) The temperature reading after 5 seconds **ii)** Time to read 95^0F

iii) Time for 90 % response

Q.2 **a)** Explain importance of 'ξ'. **(04)**

b) Describe transportation lag or dead time. **(06)**

OR

Q.2 A step change of magnitude 4 is introduced into a system having the transfer function, $G(s) = \frac{10}{s^2 + 6s + 4}$ **(10)**

Determine:

i) % overshoot **ii)** max. value of y (t)

iii) Period of oscillation **iv)** Ultimate value of y(t)

Q.3 A proportional controller is used for $\frac{1}{(s+1)(0.5s+1)}$ following system. The value of the steady state gain of controller is 5. Consider unity feedback control system. The set point of the control system is given step change of magnitude 0.5. determine the offset **(10)**

OR

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

Q.4 Construct routh array for following system. $G(s) = \frac{3k_C}{(s+1)(s+3)(0.5s+1)}$. **(10)**

OR

Q.4 Draw root locus diagram for $G(s) = \frac{k}{s(s^2+2s+2)}$. **(10)**

Q.5 Draw Bode plot for **(10)**

i) First order system **ii)** Second order system

OR

Q.5 Describe Ziegler Nichols optimum controller settings. **(10)**

Q.6 Explain selective control systems in detail. **(10)**

OR

Q.6 Write short note on: **(10)**

i) Feed forward - Feedback Control

ii) Split – Range Control

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