

B.TECH SEM – VII (2007 COURSE) (CHEMICAL ENGG.) :

WINTER - 2017

SUBJECT: PROCESS DYNAMICS & CONTROL

Day: **Friday**

Date: **19/01/2018**

W-2017-2545

Time: **02.30 PM TO 05.30 PM**

Max Marks: **80**

N.B:

- 1) **Q. No 1 & 5 are COMPULSORY.**
- 2) Out of remaining attempt any **TWO** questions from each section.
- 3) Answers to the two sections should be written in **SEPARATE** answer book.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.
- 5) Figures to the right indicate **FULL marks.**
- 6) Assume suitable data if **NECESSARY.**

SECTION- I

- Q.1** a) Explain the inverse response system in detail with an example. (05)
b) Find the value of K_c by using a suitable stability method for a given system. (05)
 $S^4 + 7S^2 + 2S + 3(1 + K_c) = 0$
c) When is Z- N tuning technique used? What are Z- N recommended setting for feedback controllers. (04)
- Q.2** a) Explain the step wise procedure for semi log plot method of process identification. (09)
b) What are different feed back control systems. Explain the differences between their action with respect to responses. (04)
- Q.3** Draw the root locus diagram for the system. (13)
$$G(S) = \frac{K_c(1 + 2S)}{S(S + 1)(S + 3)}$$
- Q.4** a) Find the cohen- coon method settings for the following (09)
Given.
$$G_{proc} = \frac{10e^{-2.5s}}{20S + 1}$$

b) Explain the lead and lag compensation in detail. (04)

SECTION- II

- Q.5** a) What is programmed adaptive control and self adaptive control? When would you recommend the programmed and when the self- adaptive scheme. (06)
b) Explain the use of decoupler in two control loops? (04)
c) What are advance control systems? Brief any one advance control system used in industry. (04)
- Q.6** a) Why is ratio controller useful in process control? Elaborate the ratio control system with different configurations and explain any one example in detail. (09)
b) What kind of processes stand to benefit the most from the feed forward control system? Why? (04)
- Q.7** Consider a process with two controlled outputs and two manipulated inputs the input- output relationship given by. (13)
 $y_1(s) = H_{11}(s) m_1(s) + H_{12}(s) m_2(s)$
 $y_2(s) = H_{21}(s) m_1(s) + H_{22}(s) m_2(s)$
Discuss the interaction between the loops when (i) one loop is closed (ii) Both loops are closed.
Draw a neat block diagram for both conditions.
- Q.8** Write a short note on (13)
i) DDC
ii) PLC