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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**I Year M.Tech II Semester (R16) Regular Examinations May/June 2017****PROCESS DYNAMICS AND CONTROL**

(CONTROL SYSTEMS)

(For Students admitted in 2016 only)

Time: **3 hours**Max. Marks:**60**(Answer all Five Units **5 X 12 =60** Marks)**UNIT-I**

- Q.1** a. Define 'process', 'controlled variable', 'manipulated variable', and 'disturbance variable' giving suitable examples. 6M
- b. Compare and contrast various process control strategies with reference to any one physical example. 6M

OR

- Q.2** Mention various elements involved in the process control and explain their function with neat block diagram. 12M

UNIT-II

- Q.3** Develop the transfer function for CSTR blending process. 12M

OR

- Q.4** a. What is the differential equation model of the series PID controller? Qualitatively describe its response to a step change in $e(t)$. 6M
- b. What are the features of smart sensors? 6M

UNIT-III

- Q.5** Draw root locus diagram for control system that have open loop transfer function
 $G(S) = 4kc / (s+1)(s+2)(s+3)$ 12M

OR

- Q.6** Describe the mathematical approach of tuning PID controller parameters through Internal Model Control method. 12M

UNIT-IV

- Q.7** a. What is a feed forward control? What are the disadvantages of feed forward control? Compare feed forward and feedback controls. 6M
- b. What are the configurations for feed forward – feedback control? 6M

OR

- Q.8** Explain how the PID controller parameters are tuned by Process Reaction Curve method. 12M

UNIT-V

Q.9 Discuss pairing of controlled and manipulated variables. 12M

OR

Q.10 a. Explain any two physical examples of multivariable control problems. 6M
b. A process has the transfer function matrix:

$$\begin{bmatrix} \frac{5e^{-5s}}{4s+1} & \frac{2e^{-4s}}{8s+1} \\ \frac{3e^{-3s}}{12s+1} & \frac{6e^{-3s}}{10s+1} \end{bmatrix}$$

Find the expressions for ideal decouplers and indicate how they can be simplified based on practical considerations. 6M

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