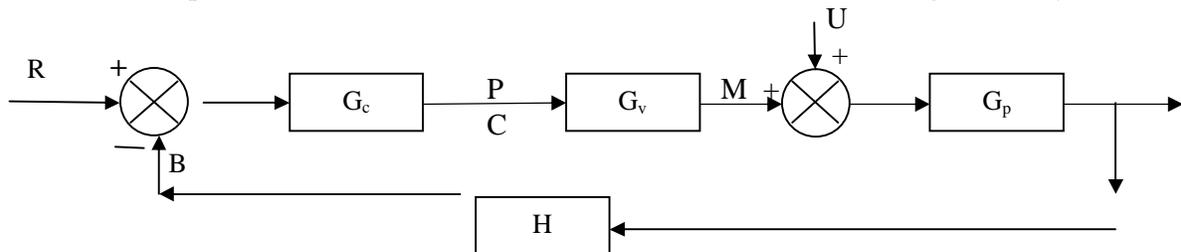


**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014**

**Subject Code: 2711603****Date: 09-01-2015****Subject Name: Computerized Process Control****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Enlist the various types of network topology and discuss any two in detail. **07**  
 (b) Explain the main advantages and disadvantages of an electric transducer. **07**
- Q.2** (a) Explain the Distributed Control System in detail, using an actual case study, enlisting its advantages. **07**  
 (b) Compare the different modes of control (P, PI, PID) using the graph of deviation of controlled variable versus time. **07**
- OR**
- (b) Compare pneumatic controllers and electronic controllers, enlisting the advantages and disadvantages of each. **07**
- Q.3** (a) What steps are involved in signal conditioning? Explain Input signal Buffering, amplification and isolation in detail. **07**  
 (b) Explain the different errors that are encountered in measurement. **07**
- OR**
- Q.3** (a) Write a brief note on microcontrollers and digital signal processing. **07**  
 (b) Explain the concept of linearity and hysteresis **07**
- Q.4** (a) Determine the overall transfer function relating the controlled variable with set point for a constant value of the load variable, for the following control system: **07**



- (b) Enlist the aims of plant automation and explain any two in detail. **07**
- OR**
- Q.4** (a) Write a note on Industrial Automation. Enlist the various factors that have contributed to the development of modern automation technology and discuss any one in detail. **07**  
 (b) Enlist the various temperature measuring instruments and explain any one in detail. **07**
- Q.5** (a) Explain with block diagram the computer control of a batch reactor or a fed-batch fermenter. **07**

- (b) Discuss the limitations of the Routh test for stability and using the Routh criterion, determine the stability of the control system having the open loop transfer function given as: **07**  
 $G(s) = k_c / [s(s+1)(s+2)]$

**OR**

- Q.5** (a) Enlist and explain the advantages of Digital Computer Control along with the process control requirements of computers. **07**
- (b) A unit step change is given to a PI controller. If the proportional sensitivity or gain  $K_c$  is 4, the integral time is 2, obtain the response of the PI controller, using the plot of output signal of the controller versus time. **07**

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