

**GUJARAT TECHNOLOGICAL UNIVERSITY****PDDC - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code: X 71904****Date: 05-12-2014****Subject Name: Control Engineering****Time: 10:30 am - 01:00 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) Differentiate open loop control system and closed loop control system in following aspect : **07**  
Definition, diagrams, advantages, disadvantages and practical examples.
- (b) Reduce block diagram as shown in Figure 1 and obtain overall transfer function. **07**
- Q.2** (a) What is block diagram? State the advantages and disadvantages of the block diagram. **07**
- (b) What is a signal flow graph? How does signal flow graph differ with block diagram? State the properties of signal flow graph. **07**
- OR**
- (b) Using Mason's gain formula, find the gain of the system shown in Figure 2 **07**
- Q.3** (a) What do you mean by the stability of the system? With suitable example, explain any one of the stability criterion. **07**
- (b) Define following terms in context with the transient response specifications of second order system using neat sketch: **07**  
Delay time, Rise time, Peak time, Settling time, Maximum overshoot and Steady state error
- OR**
- Q.3** (a) Using Routh criterion, discuss about the stability for the system having whose characteristic equation is given as  $s^5 + 2s^4 + 6s^3 + 12s^2 + 6s + 10 = 0$  **07**
- (b) What is a programmable logic controller? Write down industrial applications of a programmable logic controller. **07**
- Q.4** (a) Describe the proportional control action type automatic industrial controller with neat sketch. **07**
- (b) What is hydraulic system? List out major components of the hydraulic system. Explain any two with neat sketch. **07**
- OR**
- Q.4** (a) Discuss about an on-off control action type automatic industrial controller with differential gap. **07**
- (b) What are the characteristics of DC motors? Give the classification of DC motors and explain any one with neat sketch. **07**
- Q.5** (a) State the advantages and disadvantages of hydraulic control system. **07**
- (b) Draw and explain detailed block diagram of fuzzy logic controller. **07**
- OR**
- Q.5** (a) Compare between pneumatic control system and hydraulic control system. **07**
- (b) Define transfer function. State the advantages and disadvantages of it. **07**

\*\*\*\*\*

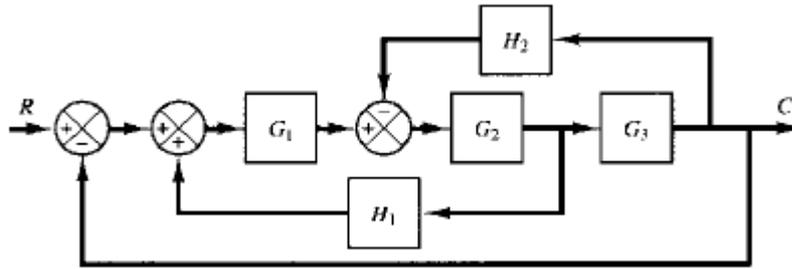


Figure 1, Q. 1(b)

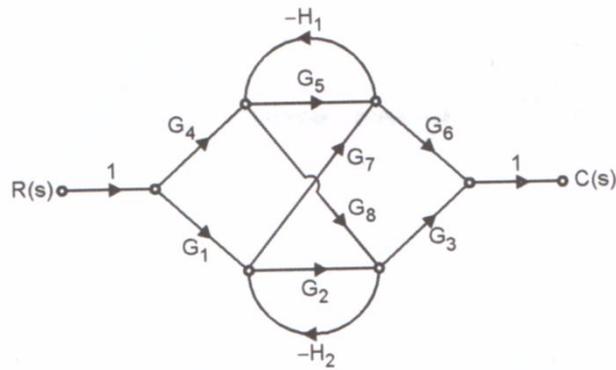


Figure 2, Q. 2(b)