

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC– SEMESTER VII– • EXAMINATION – SUMMER - 2016

Subject Code: X71904**Date: 21/11/2016****Subject Name: Control Engineering****Time: 10:30 AM to 1:00 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 examples
- (b) Compare between pneumatic control system and hydraulic control system. **07**
- Q.2** (a) What is a signal flow graph? What are properties of signal flow graph? State and explain Mason's gain formula for signal flow graph. **07**
- (b) What is block diagram? State the advantages, disadvantages and application of block diagram. **07**
- OR**
- (b) List the block diagram rules and explain any two with necessary diagram. **07**
- Q.3** (a) Reduce block diagram as shown in figure 1 and obtain overall transfer function. **07**
- (b) Describe force-voltage analogy and force-current analogy as applied to electrical analogies for mechanical systems. **07**
- OR**
- Q.3** (a) Using Mason's gain formula, find the gain of the system shown in figure 2. **07**
- (b) Define transfer function. State the advantages and disadvantages of it. **07**
- Q.4** (a) Define following terminologies in reference to transient response specifications of second order system using neat sketch: **07**
- 1) Peak time
 - 2) Rise time
 - 3) Delay time
 - 4) Settling time
 - 5) Maximum overshoot
 - 6) Steady state error
- (b) Examine the stability by Hurwitz criterion of following characteristic equation. **07**
 $s^4 + 8s^3 + 18s^2 + 16s + 5 = 0$
- OR**
- Q.4** (a) Describe a proportional plus integral plus derivative control action type automatic industrial controller. Write down equation of the system, write down expression for the transfer function. **07**
- (b) Explain in detail about ON-OFF controller with necessary diagrams. **07**
- Q.5** (a) Draw and explain the block diagram of PLC. Also state advantages and disadvantages of PLC system. **07**
- (b) Describe control system for a thermal power plant with the help of a schematic diagram and a block diagram. **07**

OR

- Q.5 (a)** Define hydraulic system. State the major components of hydraulic system. **07**
 Name the various types of pumps commonly used for hydraulic power purposes.
- (b)** Define pneumatic system. State the advantages, disadvantages and applications **07**
 of pneumatic system.

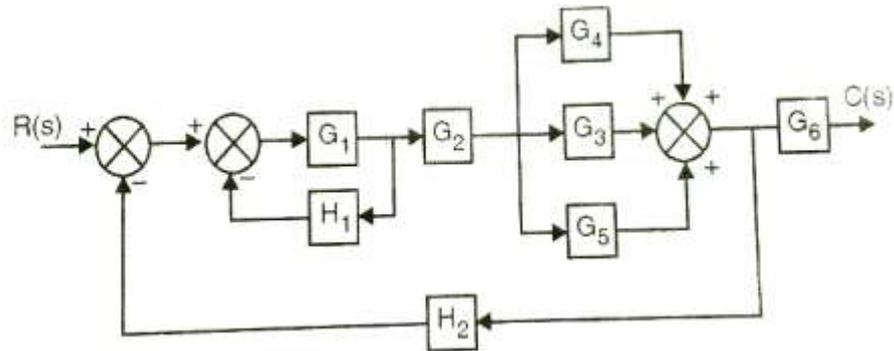


Figure 1 Q.3(a)

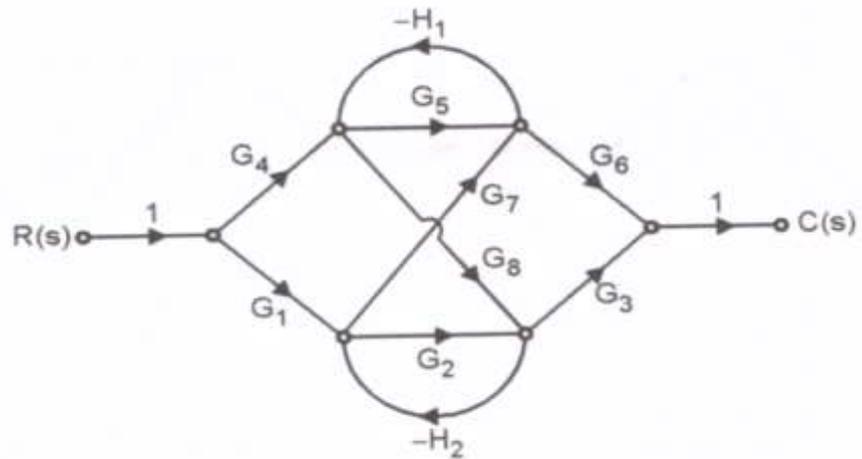


Figure 2 Q.3(a) OR
