Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-1220**
**FACULTY OF SCIENCE AND TECHNOLOGY**
**Final .Tech.(Mech/Prod) (Sem-VII)**
**Automatic Control System**
**[OLD]**

**[Time: Three Hours]** **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1) Q.No.1 from section A and Q.No.6 from section B are compulsory.
2) Solve any two questions from remaining questions from each section.
3) Assume suitable data, if required.

## Section A

Q.1 Answer any five of the followings: 10
- i) Define closed loop system.
- ii) Draw and explain Block Diagram of a closed loop system.
- iii) Define feedback path in a closed loop system.
- iv) Describe Zeros and poles of a transfer Function.
- v) Explain direct Analogy
- vi) Enlist various components in a control system.

Q.2 a) Derive a characteristic equation of a Electrical system [L-C-R] 08

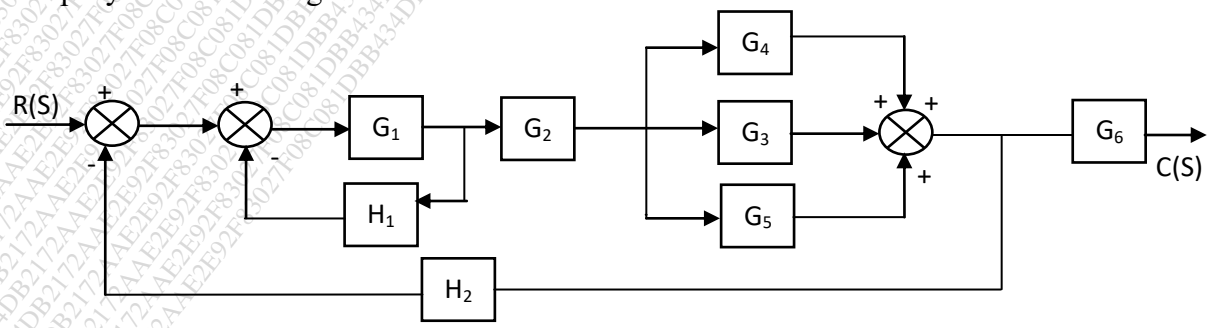
b) Derive a characteristic equation of Rotational Mechanical system. 07

Q.3 a) Write a note on Gear Pump. 08

b) Describe valves and their importance in Hydraulic system? Explain 2 way and 3 way directional control valves. 07

Q.4 a) Explain Block Diagrams and its significance in control system? Describe the process of simplification of Blocks in: 08
- i) Parallel
- ii) Series

b) Simplify the Block Diagrams and obtain its Transfer Function. 07



Q.5 Write short notes on: (any three) 15

i) Optical Encoder
ii) Pneumatic Flapper Mechanism
iii) Linear Mechanical System
iv) Pressure Control Relays

## Section B

Q.6 Answer any five of the followings: 10

i) Define ON-OFF Controller
ii) Describe Response and its types
iii) Explain Stability and its importance
iv) Define a Takeoff point in a Block Diagram
v) Define a Second Order System
vi) Describe peak time and rise time.

Q.7 a) Write a note on Stepper Motor. 08

b) Define various modes of control? Explain PID control action with figure. 07

Q.8 a) What are standard test signals? Explain various standard test input signals with Figures. 08

b) Explain the Proportional (P) controller in detail. 07

Q.9 a) Describe Routh's Stability Criteria. 05

b) Explain Bodes Plot in detail? And describe the following in detail. 05

i) Gain Margine
ii) Phase Margine
iii) Stability of the system

c) Check the stability of the system whose characteristic equation is as follows 05

$S^4 + 2S^3 + 3S^2 + 4S + 5 = 0$

Q.10 Write short notes on: (any three) 15

1. Derivative Controller
2. Hydraulic Actuation System
3. Pneumatic Cylinders
4. Frequency Response