Scheme - G

Sample Test Paper-I

Course Name : Diploma in Industrial Electronics

Course Code : IE/IS/IC

Semester : Fifth **17538**

Subject Title : Control system

Marks : 25 **Time: 1 hour**

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with neat sketches wherever necessary
3. Figure to the right indicates full marks
4. Preferably write the answer in sequential order.

Q1) Attempt any three: **9 Marks**

a) Compare open loop and closed loop system on the basis of feedback, stability and example.

b) Define transient and steady state response with diagram.

c) List the three standard test signals and draw the response.

d) Whether toaster is a open lop or close loop system ? Justify

Q2) Attempt any two: **8 Marks**

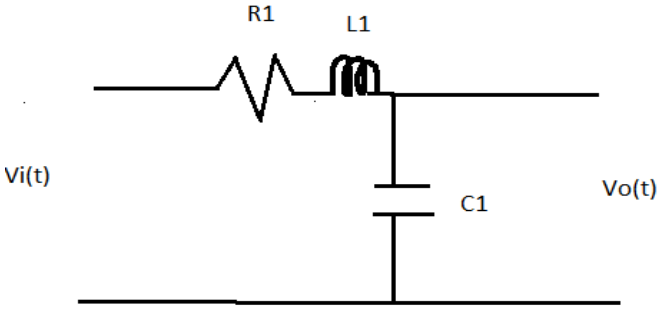
a) State any four block reduction rules.

b) State Routh's stability Criterion with the help of example.

c) A unity feedback system has G(s)
G(S) = $10(S+1) / s^2(s+2)(S+10)$ Find type of the system and three error coefficients .

Q3) Attempt any two: **8 Marks**

a) Obtain Vo(S)/ Vi(s) for following Electrical Circuit n/w.



b) Write standard equation for first order system and second order system. Give one practical example of each.

c) Determine Stability with characteristic equation $s^4+4s^3+s^2+8s+1=0$

Scheme - G

Sample Test Paper-II

Course Name : Diploma in Industrial Electronics

Course Code : IE/IS/IC

Semester : Fifth **17538**

Subject Title : Control system

Marks : 25 **Time: 1 hour**

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with neat sketches wherever necessary
3. Figure to the right indicates full marks
4. Preferably write the answer in sequential order.

Q1) Attempt any three: **9 Marks**

a) Compare P-control with PID control action on the basis of definition, equation and application.

b) Define relative stability, gain margin and phase margin.

c) Distinguish between AC Servo motor and DC Servo motor (any three points)

d) Write 2advantages and one disadvantage of integral control action.

Q2) Attempt any two: **8 Marks**

a) State the reason why derivative control action is not used alone. Draw PD electronic controller.

b) Draw Bode plot for 10/s

c) Draw DC servo motor and AC Servo motor Characteristics.

Q3) Attempt any two: **8 Marks**

a) Describe On –Off control action with block diagram and equation.

b) State the condition for stable, unstable and marginal stable based on gain margin and phase margin.

c) Draw and explain potentiometer as error detector.

Scheme - G

Sample Question Paper

Course Name : Diploma in Industrial Electronics

Course Code : IE/IS/IC

Semester : Fifth **17538**

Subject Title : Control system

Marks : 100 **Time: 3 hours**

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with neat sketches wherever necessary
3. Figure to the right indicates full marks
4. Preferably write the answer in sequential order.

Q1. (A) Attempt any Three. **12 Marks**

a) Define open loop and closed loop system. Draw the block diagram of each.

b) List the four standard test input signals. Write their laplace representation.

c) Define stability. Draw the location of poles for stable, unstable critical stable system.

d) Identify the controller that eliminates the drawback of proportional control action. Draw response graph with equation.

Q1. (B) Attempt any one. **06 Marks**

a) Derive transfer function of closed loop system.

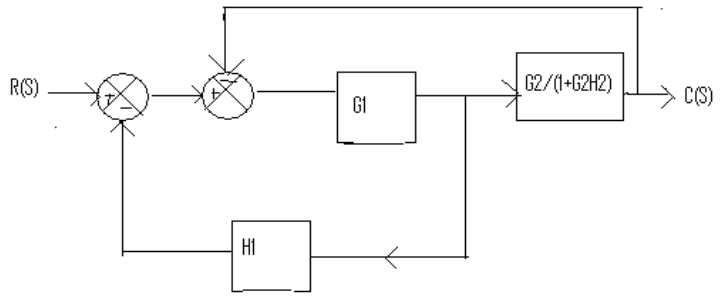
b) Draw bode plot for the system with open loop transfer function G(s) H(s) = 20/s(1+2S)

Q2. Attempt any Two. **16 Marks**

a) A system has G(s) H(S) = k(s+13)/s(S+3)(S+7)
Where k is positive. Determine the range of k values for system stability.

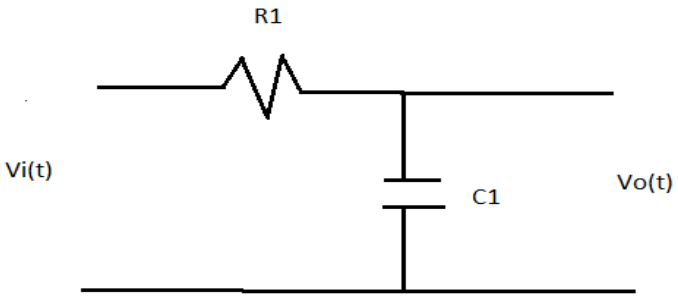
b) i) Describe the working of variable reluctance stepper motor with neat diagram.
ii) Draw the characteristics of AC Servo motor. In what way it is different from normal 2 phase induction motor.

c) Define transfer function and obtain c(s)/R(s) for following block diagram



Q3. Attempt any four. **16 Marks**

a) Obtain the transfer function of given electrical circuit.



b) Describe the effect of damping for all 4 cases with the help of location of poles and output response.

c) Determine the stability by using Rouths criterion $S^4+4S^3+S^2+8S+1=0$.

d) Compare stepper motor and DC servo motor (any 4 points).

e) State the concept of neutral zone and proportional band.

Q4. A) Attempt any Three. **12 Marks**

a) Draw the block diagram of process control system and explain each block..

b) State two advantages and disadvantages of frequency response analysis.

c) For the given transfer function

T.F. = 10(S+8)/S(S+4)(S2+6s+25)

Find i) Poles ii) Zeros iii) Characteristic equation and iv) order of the system

d) Define servo system. Draw the schematic of DC servo system and explain each component.

Q4. B) Attempt any one. **06 Marks**

a) Identify which servo component can be used as error detector in ac servo system. Draw and explain it.

b) For the given differential equation $d^2y/dt^2 + 4dy/dt + 8y(t) = 8x(t)$

where y = o/p x=i/p

Find i) Settling time ii) Rise time iii) Peak time iv) Peak overshoot

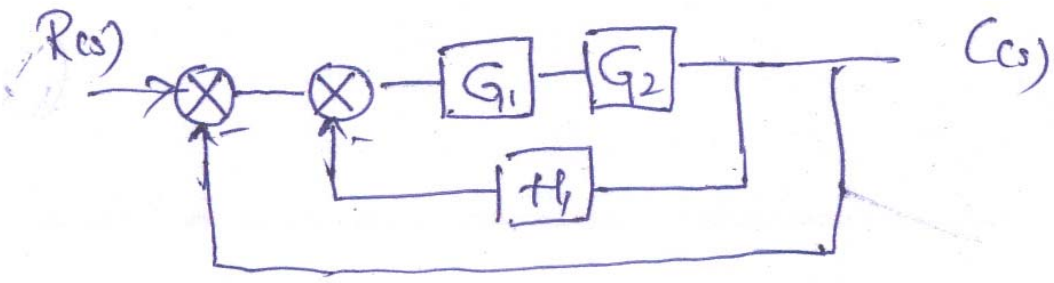
Q.5 Attempt any four. 16 Marks

a) Draw and explain the working of potentiometer as error detector.

b) Draw electronic PI controller. State the components used and write equation.

c) What is marginal stability? Draw the neat sketch to represent it on S-plane.

d) Find transfer function of given block diagram



e) Draw the labeled time response of second order under damped control system.

f) State the condition of stable, unstable, marginal stable based on gain margin and phase margin.

Q6. Attempt any four. 16 Marks

a) Whether toaster is open loop or closed loop system. Justify it with the help of control action.

b) Describe time response in terms of transient and steady state response with neat diagram.

c) Derive the unit step response of first order system..

d) State the 4 reasons why PID is better than other composite control action.

e) Consider 5^{th} order system with characteristic equation given by $S^5+S^4+2S^3+2S^2+3S+5=0$. Determine the stability.