

QUESTION BANK

GUJRAT UNIVERSITY EXAMINATION 2013

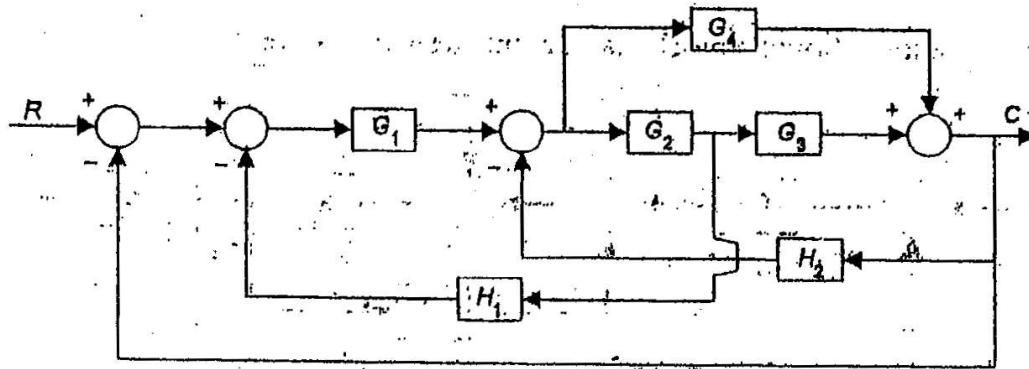
CONTROL ENGINEERING

Q.1. Compare open loop system with close loop control system

Q.2. Explain laplace transform in control system engineering.

Q.3 Define state, state variable state space representation for modern control system engineering.

Q.4 Represent in block diagram form , the control system used in automatic control system for steam For figure find transfer Solve the block diagram shown function.



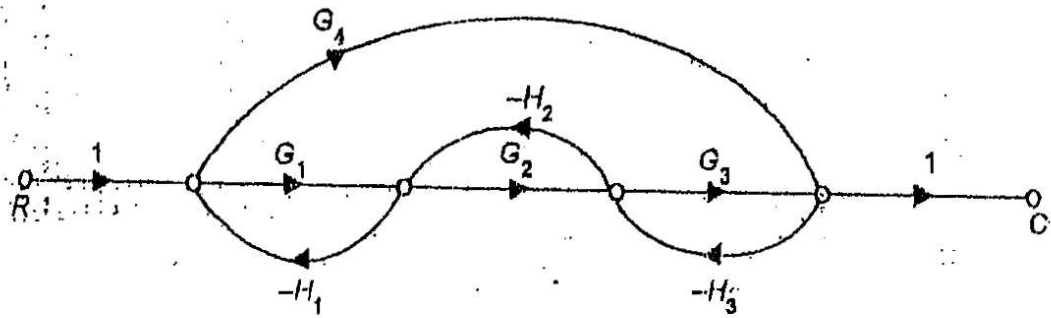
Q.5. Define following with graph.

Rise time, Delay time, Peak time, Maximum overshoot, Steady state error

Q.6

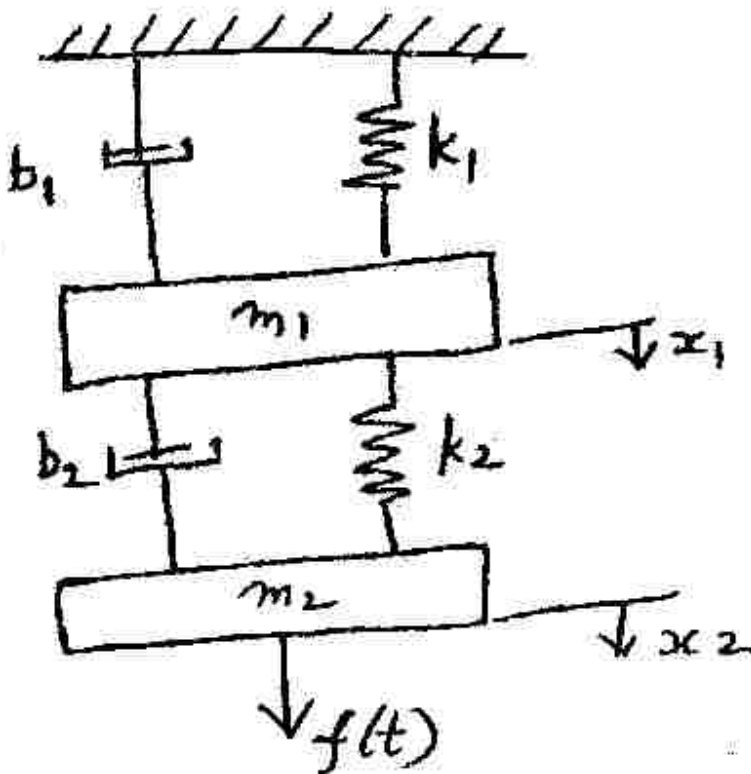
For the above system obtain rise time, peak time, maximum overshoot and settling time when  $\xi=0.6$   $\omega_n=9$  rad/sec. Derive equations for rise time, peak time and max overshoot.

Q.7. Solve with the masons gain formula as shown

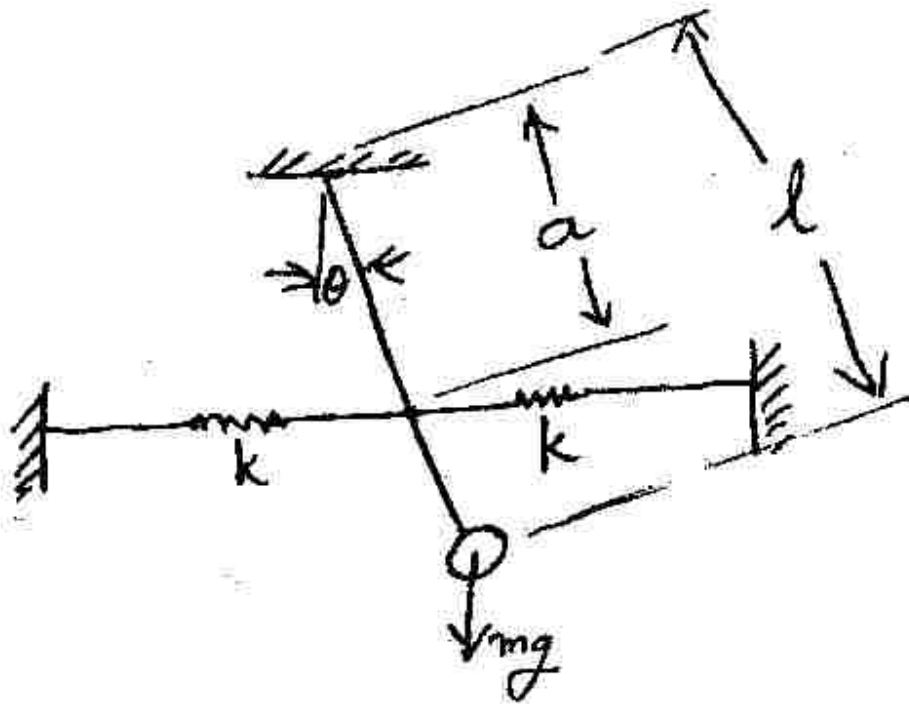


Q.8. Draw schematic block diagram for control of D.C. motor and derive its transfer function.

Q.9. Obtain transfer function for fig



Q.10. Obtain transfer function



Q.11. Explain temperature control system

Q.12. List various types of controller. Explain proportional plus derivative controller.

Q.13. Discuss about force distance type pneumatic proportional controllers.

Q.14. Differentiate hydraulic control system with pneumatic control system

Q.15. Explain PID Controllers with at least one example.

Q.16. Determine the stability for a closed loop control system whose characteristic equation is  $S^6 + S^5 + 5S^4 + 3S^3 + 2S^2 + 4S + 8$

Q.17. Draw root locus and determine break away point, angle of departure, stability condition

$$G(s)H(s) = K / S(S+6)(S^2 + 4S + 13)$$

Q.18. Write down the general rule for constructing root locus.

Q.19. Explain "Programmable logic controller"

Q.20. Boiler feed water control system

Q.21. Hydraulic direction control valve

Q.22. Pneumatic nozzle flapper device.

Q.23. Explain Fuzzy logic controllers

Q.24

Define the following :

- |                                |                                    |
|--------------------------------|------------------------------------|
| ( i ) System                   | ( iv ) Automation                  |
| ( ii ) Control system          | ( v ) Open loop control system     |
| ( iii ) Process Control system | ( vi ) Closed loop control system. |

Q.25

Distinguish between the following :

- ( i ) Negative feedback and positive feedback
- ( ii ) Feed forward control system and feedback control system.

Q.26.

List down five examples each of open loop control system and closed loop control system.

Q.27

Draw a block diagram for a

- ( i ) Series R-L-C network
- ( ii ) Parallel R-L-C network

Write down equations of state and expression for transfer functions for the above.

Q.28.

Draw functional block diagram of the behavior of a car. Consider the input to be the displacement of accelerator and the output the speed of car.

Q.29.

Derive mathematically, the time response of a first order control system to a unit steps input. Express this response graphically and discuss the important characteristics of such a time response.

Q.30

Prove mathematically, that the steady state error in the unit-ramp response of first order system is equal to the time constant of the system.

Q.31

Explain the meaning of derivative control action. Give an example of the controller employing derivative control action only.

Q.32

Explain the meaning of integral control action. With the help of an example, explain the functions of a controller employing integral control action only.

Q.33

Determine the range of K for which the system represented by the following characteristics equation is stable :

$$s^2 + Ks + 2K - 1 = 0$$

Q.34

Write down step wise procedure for drawing the root-loci of a closed loop control system. Illustrate the method with the help of a typical example.

Q.35

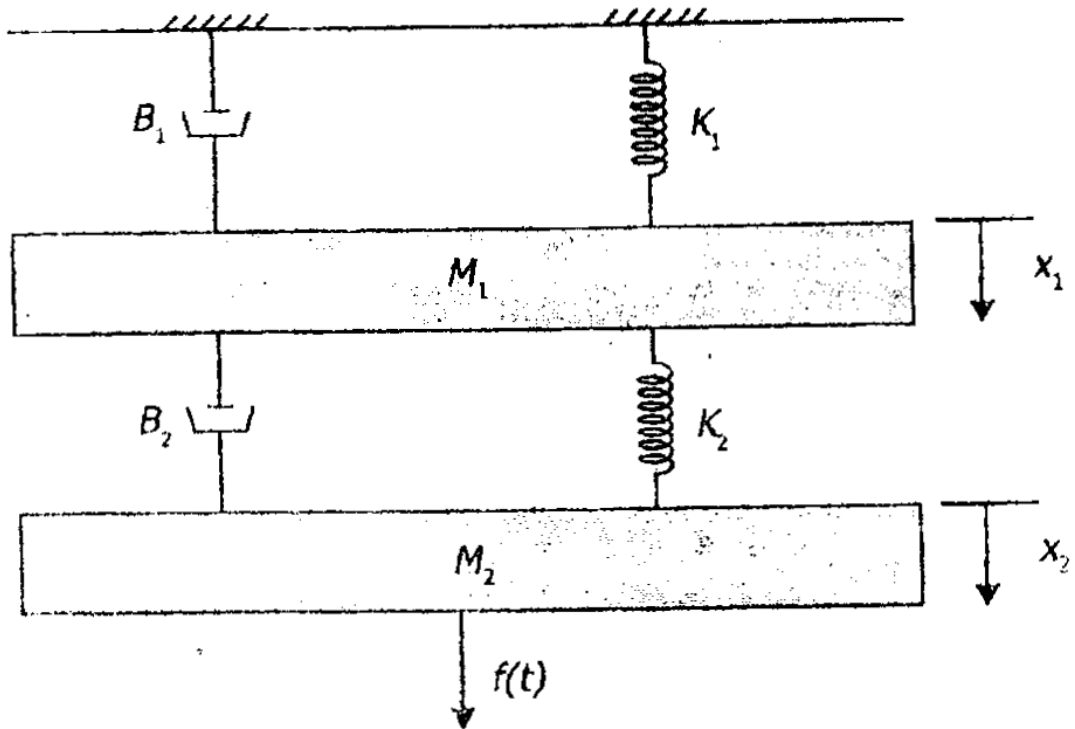
A feedback control system has the following characteristics equation :

$$s^4 + 3s^3 + 12s^2 + (K-16)s + K = 0.$$

Determine the root-loci for this system. Show that the system is conditionally stable.

Q.36

Obtain mathematical model for following figure.



Q.37.

Explain state space representation in control system

Q.38

Comparison between pneumatic control and hydraulic control system.

Q.39

Advantages and disadvantages of hydraulic system.

Q.40

Write short note on microcontrollers.