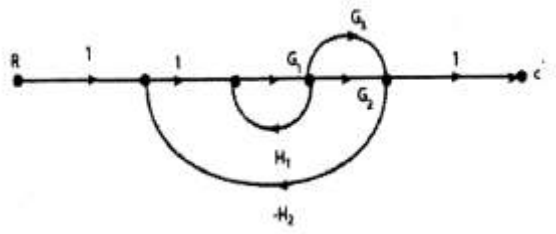
Q.20 Find the transfer function (C/R) of the given signal flow graph-



Q.21 Write any 4 differences between linear and non-linear system.

Q.22 Explain over damped and critically damped system with example.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x8=16)

Q.23 What is block diagram reduction technique in control system? Why it is used? Explain any 3 steps involved in this technique.

Q.24 Write down the definition of non-linear system. Explain the principle of superposition and homogeneity. Explain any three types of non-linearities.

Q.25 What are the basic elements of control system? Define open loop and closed loop control system. Write any four differences between open loop and closed loop system.

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3rd Sem / Instrimentation & Control

Subject : Control System Engineering

Time : 3 Hrs. M.M. : 60

SECTION-A

Note: Multiple choice questions. All questions are compulsory (6x1=6)

Q.1 Which of the following is correct for an open loop control system?

a) It is expensive as compared to closed loop control system
b) It consist of a sensor in the feedback
c) It is more accurate compared to closed loop control system
d) It is highly insensitive towards the change in forward path parameter.

Q.2 Transfer function is the ratio of Laplace transform of

a) Output to input when initial condition is not zero
b) Input to output when the initial condition is zero
c) Output to the input when initial condition is zero
d) Input to output when the initial condition is not zero

Q.3 The system is called as linear if it follows
- a) The superposition theorem
- b) Homogeneity principle
- c) Square law
- d) Both superposition and homogeneity principle

Q.4 Bode plot is used to find the
- a) Time response of the linear system
- b) Time response of both linear and non-linear system
- c) Frequency response of the non-linear system
- d) Stability of a system

Q.5 The Laplace transform of the unit step function is
- a) s b) s^2
- c) 1/s d) 1

Q.6 Mason's gain rule is used to find the
- a) Transfer function of a control system
- b) Frequency response of a system
- c) Time response of a system
- d) Stability of a system

SECTION-B

Note: Objective/ Completion type questions. All questions are compulsory. (6x1=6)

Q.7 Define the term "Stability".

Q.8 Expand OLCS.

Q.9 What is the value of damping constant for a critically damped system?

Q.10 Define rise time for a second order system.

Q.11 Define the term dead zone.

Q.12 What are the standard test signals in control system?

SECTION-C

Note: Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

Q.13 Write any four differences between open loop and closed loop control system.

Q.14 Find out the time response of the first order system when subjected to impulse input.

Q.15 Define the following-
- a) Delay time b) Peak time
- c) Settling time d) Steady-state error

Q.16 For the given characteristics equation below, apply R-H criteria and check the stability of the system-

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

Q.17 Write down all the steps involve in root locus technique.

Q.18 Explain the principle of superposition and homogeneity of a system.

Q.19 Define the following-
- a) Saturation
- b) Hysteresis
- c) Limit cycles
- d) Jump resonance.