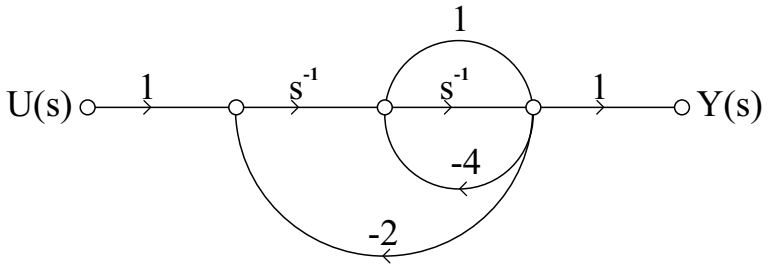
Q.20 Find the transfer function (Y/U) of the given signal flow graph-




Q.21 Write any four differences between open loop control system and closed loop control system.

Q.22 Explain relay and friction with example.

## SECTION-D

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

Q.23 What is signal flow graph in control system? Why it is used? Explain al the steps involved in this technique.

Q.24 What is Routh-Hurtwitz (RH) criteria? Explain all the conditions of RH criteria. Why it is used in control system?

Q.25 Write a short note on following-

a) Signal flow graph

b) Principle of superposition and Homogeneity



No. of Printed Pages : 4 221531

Roll No. .....

**3rd Sem / Instrumentation & Control**

**Subject:- Control System Engineering**

Time : 3Hrs. M.M. : 60

## SECTION-A

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

Q.1 We can find the transfer function of a system if the system is

a) Linear

b) Non-linear

c) Time variant

d) Linear and time invariant

Q.2 The second order system is called over damped if the damping constant of the system is

a) 0 b) 1

c) Greater than 1 d) Lies between 0 and 1

Q.3 The system is called as non-linear if it does not follow

a) The superposition theorem

b) Homogeneity principle

c) Both superposition and homogeneity principle

d) Exponential law

Q.4 Root locus technique is used to find the

a) Frequency response of the linear system

b) Time response of both linear and non-linear system

c) Time response of the non-linear system

d) Absolute stability of a system

Q.5 The laplace transform of the unit impulse function is

a) s b) $s^2$

c) 1/s d) 1

Q.6 Block diagram reduction technique 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 time constant.

Q.8 Expand CLCS.

Q.9 Routh-Hurwitz criteria used to check the stability of a system . (True/False)

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

Q.11 Define the term hysteresis.



Q.12 What are the different methods to find the transfer function of the 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 linear and nonlinear system.

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

Q.15 Define the following terms:-

a) Rise time

b) Peak overshoot

c) Step signal

d) Steady-state response of the system

Q.16 For the given characteristic equation below, apply Routh Hurwitz criteria and check the stability of the system.

$S^3 + 3s^2 + 5s + 17 = 0$

Q.17 Write all the steps to draw Bode plot to check the stability of the system.

Q.18 Explain the Mason's gain formula to find the transfer function of the system.

Q.19 Define the following-

a) Backlash b) Dead zone

c) Jump phenomenon d) Limit cycle