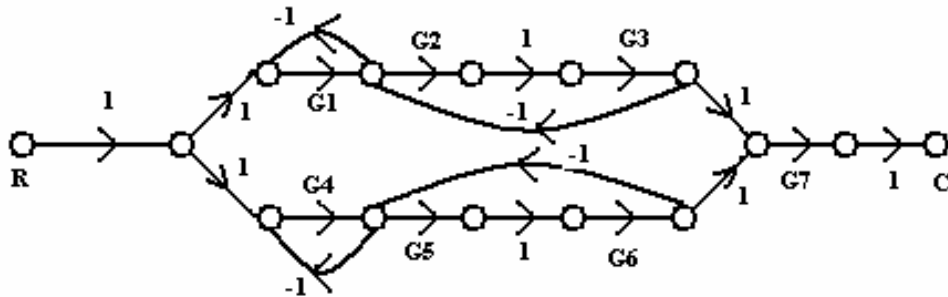1. obtain the overall transfer function C/R from the single flow graph.

2. For the system represented by following eguations, Draw Signal Flow Graph and Block Diagram taking X_6 as output and X_1 as input.   (Pl. Ask student to solve it for Transfer Function X_6/X_1 at their own.)

$X_2 = 6X_1 - 2X_5$; $X_3 = 2X_2 - X_4$; $X_4 = X_3$; $X_5 = 5X_4$; $X_6 = 3X_5 + 2X_2$

3. obtain the overall transfer function C/R from the single flow graph
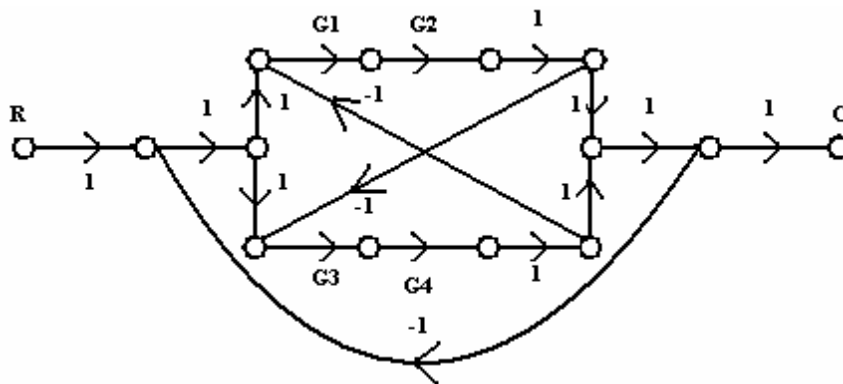
Q.4 A field controlled DC Servo Motor is used to control the speed of a load. The system components are given below--

Load with inertia (J_L) 5 kg-m^2; friction coefficient (B_L) 0.5 Nm/rad/sec; tachometer for error detection (K_t) 5V/rad/sec; a reference DC voltage source V_r is available for setting the speed; gain of DC amplifier (K_A) 10 V/V; Motor torque constant (K_T) 1 Nm/A; Motor field resistance (R_f) and inductance (L_f) are 100 Ohm and 100 mH respectively. For this system

(a) Draw the physical Diagram, Block diagram and

(b) Find transfer function ω_L (s) / V_r (s).