Test 1

Question 1

By using *"d/dt"* differential block and *"a_1"* scalar block shown in Fig Q1, draw the block diagram representation of the following functions:

$$(a) \quad x_2 = a_1\left(\frac{dx_1}{dt}\right) \qquad (b) \quad x_3 = \frac{d^2x_2}{dt^2} + \frac{dx_1}{dt} - x_1$$

Fig Q1

Question 2

Obtain the Laplace Inverse Transform of the following equation:

$$F(s) = \frac{5(s+2)}{s^2(s+1)(s+3)}$$

Question 3

Simplify the block diagram shown in Figure Q3, and calculate the closed loop transfer function $E_o(s)/E_i(s)$.

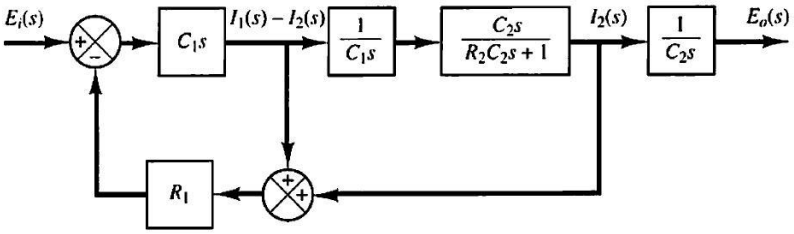

Fig. Q3

Question 4

Use the general gain formula to find the transfer function *H(s)/Q(s)* on Figure Q4

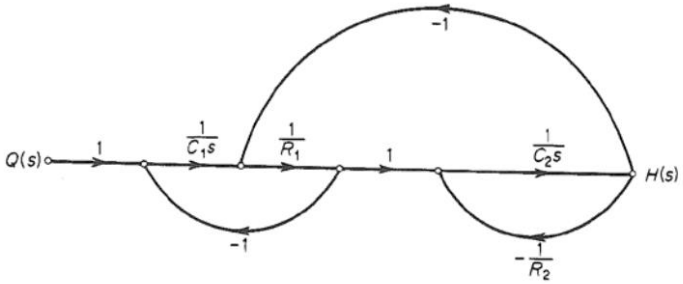

Fig. Q4