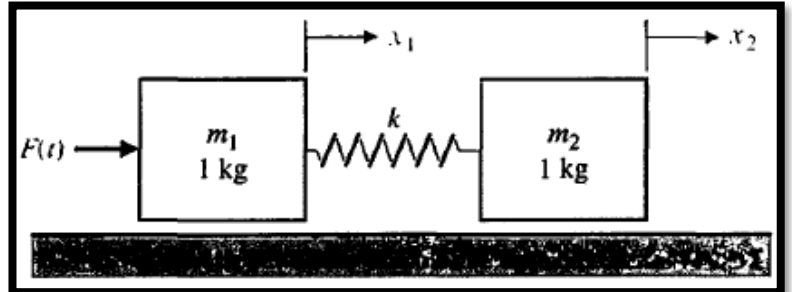
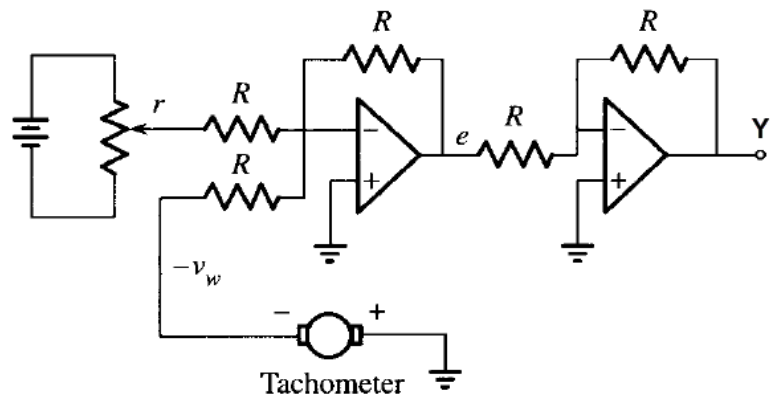


Question No. (1) (10 Marks)

1. Determine the transfer function $X_2(s)/F(s)$ for the system shown in Figure below. Both masses slide on a frictionless surface, and $k = 1 \text{ N/m}$. Draw the Block diagram

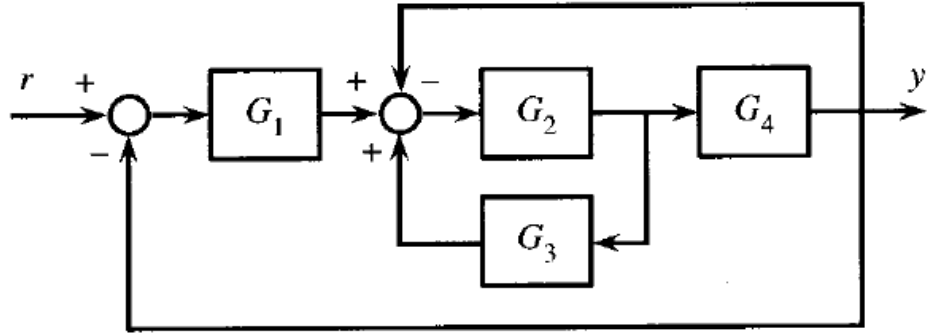
**Question No. (2) (10 Marks)**

Obtain the equation that relates the output voltage $Y(s)$ to $r(s)$ and $v_w(s)$



Question No. (3) (10 Marks)

Use block manipulation to find the transfer function from r to y

**Question No. (4) (10 Marks)**

Obtain the unit-step response of the following system:

$$\frac{C(s)}{R(s)} = \frac{10}{s^2 + 4s + 12}$$