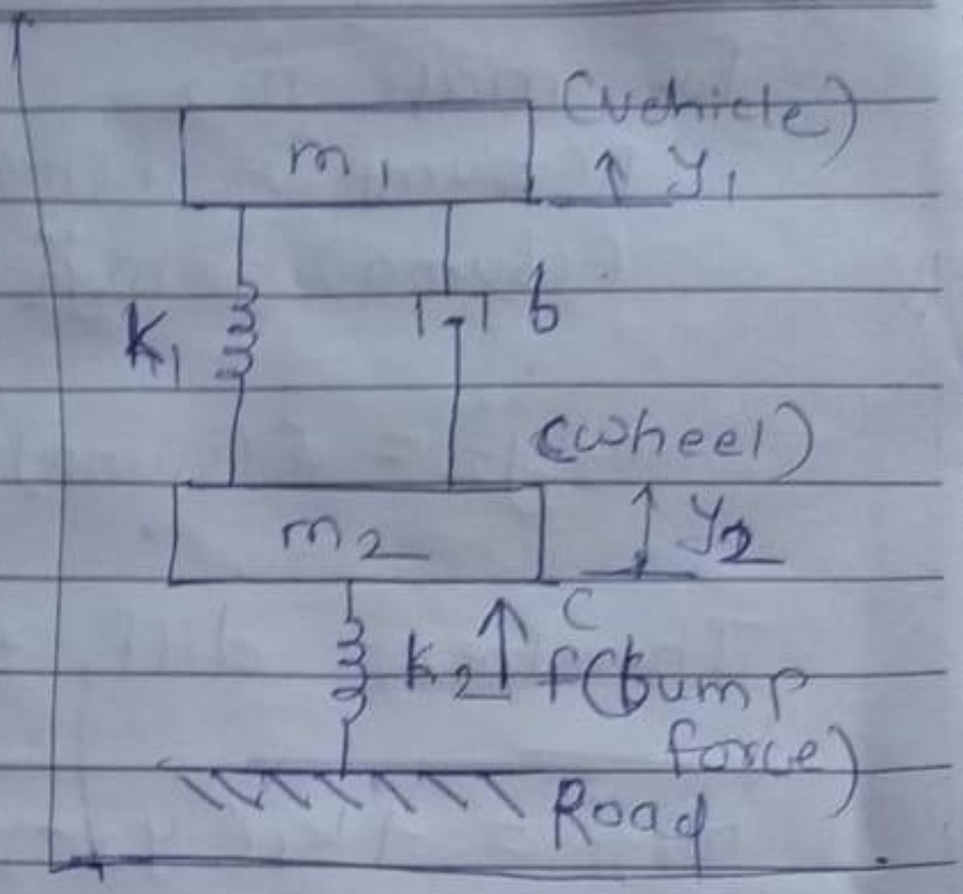
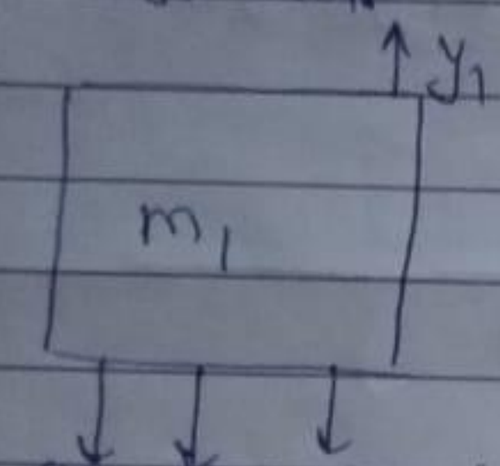
solution:-

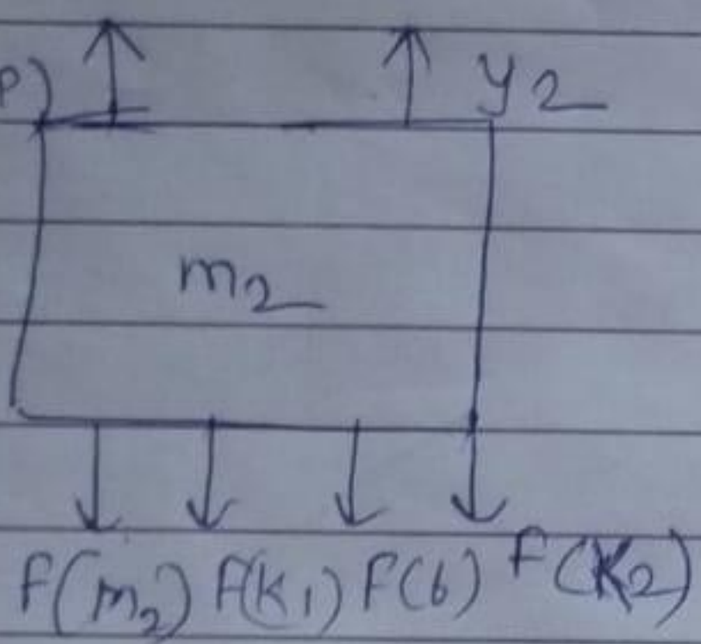
first, we have to find F.B.D of both mass $m_1$ and $m_2$




for mass $m_1$




also, for mass $m_2$




∴ for mass $m_1$,

$$0 = f(k_1) + f(b) + f(m_1)$$

$$0 = k_1(y_1 - y_2) + b(\dot{y}_1 - \dot{y}_2) + m\ddot{y}_1$$

$$\therefore m\ddot{y}_1 = -k_1(y_1 - y_2) - b(\dot{y}_1 - \dot{y}_2) \quad \text{(1.)}$$

for mass $m_2$

$$F(bump) = f(m_2) + f(k_1) + f(b) + f(k_2)$$

$$f(bump) = m_2\ddot{y}_2 + k_1(y_2 - y_1) + b(\dot{y}_2 - \dot{y}_1) + k_2 y_2$$

$$\therefore m_2\ddot{y}_2 = f(bump) - k_1(y_2 - y_1) + b(\dot{y}_2 - \dot{y}_1) - k_2 y_2 \quad \text{(ii)}$$

Therefore, diff. equations are

$$m_1\ddot{y}_1 = +k_1(y_2 - y_1) + b(\dot{y}_2 - \dot{y}_1)$$

$$m_2\ddot{y}_2 = f(bump) - k_1(y_2 - y_1) - b(\dot{y}_2 - \dot{y}_1) - k_2 y_2$$

Assume,

$b = 9000$

$k1 = 12000$

$k2 = 10000$

$m_1 = 1000$

$m2 = 100$