Kinetic Energy for Pendulum-1 is;
$T = \frac{1}{2}m_1L_1^2\dot{\theta_1}^2$

Potential Energy for Pendulum-1 is;
$V = -m_1GL_1cos(\theta_1)$

Kinetic Energy for Pendulum-2 is;
$T = \frac{1}{2}m_2L_1^2\dot{\theta_1}^2 + \frac{1}{2}m_2L_2^2\dot{\theta_2}^2 + m_2L_1L_2cos(\theta_1 - \theta_2)\dot{\theta_1}\dot{\theta_2}$

Potential Energy for Pendulum-2 is;
$V = -m_1GL_1cos(\theta_1) - m_2GL_2cos(\theta_2)$

Kinetic Energy for Pendulum-3 is;
$T = \frac{1}{2}m_3L_1^2\dot{\theta_1}^2 + \frac{1}{2}m_3L_2^2\dot{\theta_2}^2 + \frac{1}{2}m_3L_3^2\dot{\theta_3}^2 + m_3L_1L_2cos(\theta_1 - \theta_2)\dot{\theta_1}\dot{\theta_2} + m_3L_1L_3cos(\theta_1 - \theta_3)\dot{\theta_1}\dot{\theta_3} + m_3L_2L_3cos(\theta_2 - \theta_3)\dot{\theta_2}\dot{\theta_3}$

Potential Energy for Pendulum-3 is;
$V = -m_3GL_1cos(\theta_1) - m_3GL_2cos(\theta_2) - m_3GL_3cos(\theta_3)$

The Lagrangian(T-V) becomes;
$L = \frac{1}{2}(m_1 + m_2 + m_3)L_1^2\dot{\theta_1}^2 + \frac{1}{2}(m_2 + m_3)L_2^2\dot{\theta_2}^2 + \frac{1}{2}m_3L_3^2\dot{\theta_3}^2 + (m_2 + m_3)L_1L_2cos(\theta_1 - \theta_2)\dot{\theta_1}\dot{\theta_2} + m_3L_1L_3cos(\theta_1 - \theta_3)\dot{\theta_1}\dot{\theta_3}$
$+ m_3L_2L_3cos(\theta_2 - \theta_3)\dot{\theta_2}\dot{\theta_3} + (m_1 + m_2 + m_3)GL_1cos(\theta_1) + (m_2 + m_3)GL_2cos(\theta_2) + m_3GL_3cos(\theta_3)$

$$\frac{\partial L}{\partial \theta_1} - \frac{d}{dt}\left(\frac{\partial L}{\partial \dot{\theta_1}}\right) = 0$$

$Euler - Lagrange\ differential\ equation\ for\ \theta_1\ becomes;$
$\underbrace{\frac{(m_1+m_2+m_3)L_2^2}{}}_{a_1}$

$$\frac{(m_1+m_2+m_3)L_2^2}{a_1}\ddot{\theta}_1 + \frac{(m_2+m_3)L_1L_2cos(\theta_1-\theta_2)}{a_2}\ddot{\theta}_2 + \frac{m_3L_1L_3cos(\theta_1-\theta_3)}{a_3}\ddot{\theta}_3 = \frac{-(m_1+m_2+m_3)GL_1sin(\theta_1)-(m_2+m_3)L_1L_2sin(\theta_1-\theta_2)\dot{\theta_2}^2-m_3L_1L_3sin(\theta_1-\theta_3)\dot{\theta_3}^2}{d_1}$$

$$\frac{\partial L}{\partial \theta_2} - \frac{d}{dt}\left(\frac{\partial L}{\partial \dot{\theta_2}}\right) = 0$$

$Euler - Lagrange\ differential\ equation\ for\ \theta_2\ becomes;$

$$\frac{(m_2+m_3)L_1L_2cos(\theta_1-\theta_2)}{b_1}\ddot{\theta}_1 + \frac{(m_2+m_3)L_2^2}{b_2}\ddot{\theta}_2 + \frac{m_3L_2L_3cos(\theta_2-\theta_3)}{b_3}\ddot{\theta}_3 = \frac{-(m_2+m_3)GL_2sin(\theta_2)+(m_2+m_3)L_1L_2sin(\theta_1-\theta_2)\dot{\theta_1}^2-m_3L_2L_3sin(\theta_2-\theta_3)\dot{\theta_3}^2}{d_2}$$

$$\frac{\partial L}{\partial \theta_3} - \frac{d}{dt}\left(\frac{\partial L}{\partial \dot{\theta_3}}\right) = 0$$

$Euler - Lagrange\ differential\ equation\ for\ \theta_3\ becomes;$

$$\frac{m_3L_1L_3cos(\theta_1-\theta_3)}{c_1}\ddot{\theta}_1 + \frac{m_3L_2L_3cos(\theta_2-\theta_3)}{c_2}\ddot{\theta}_2 + \frac{m_3L_3^2}{c_3}\ddot{\theta}_3 = \frac{-m_3GL_3sin(\theta_3)+m_3L_1L_3sin(\theta_1-\theta_3)\dot{\theta_1}^2+m_3L_2L_3sin(\theta_2-\theta_3)\dot{\theta_2}^2}{d_3}$$

$$\begin{bmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{bmatrix} \times \begin{bmatrix} \ddot{\theta}_1 \\ \ddot{\theta}_2 \\ \ddot{\theta}_3 \end{bmatrix} = \begin{bmatrix} d_1 \\ d_2 \\ d_3 \end{bmatrix}$$

$$\ddot{\theta}_1 = \begin{pmatrix} -\frac{d_3(-a_2(a_1b_3-a_3b_1)+a_3(a_1b_2-a_2b_1))}{(a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)} \\ +\frac{d_1(a_1b_2((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))-(-a_2(a_1b_3-a_3b_1)+a_3(a_1b_2-a_2b_1))(b_1(a_1c_2-a_2c_1)-c_1(a_1b_2-a_2b_1)))}{a_1(a_1b_2-a_2b_1)((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))} \\ +\frac{d_2(-a_1a_2((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))+a_1(a_1c_2-a_2c_1)(-a_2(a_1b_3-a_3b_1)+a_3(a_1b_2-a_2b_1)))}{a_1(a_1b_2-a_2b_1)((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))} \end{pmatrix}$$

$$\ddot{\theta}_2 = \begin{pmatrix} -\frac{a_1d_3(a_1b_3-a_3b_1)}{(a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)} \\ +\frac{d_1(-b_1((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))-(a_1b_3-a_3b_1)(b_1(a_1c_2-a_2c_1)-c_1(a_1b_2-a_2b_1)))}{(a_1b_2-a_2b_1)((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))} \\ +\frac{d_2(a_1(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)+a_1((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)))}{(a_1b_2-a_2b_1)((a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1))} \end{pmatrix}$$

$$\ddot{\theta}_3 = \begin{pmatrix} -\frac{a_1d_2(a_1c_2-a_2c_1)}{(a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)} \\ +\frac{a_1d_3(a_1b_2-a_2b_1)}{(a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)} \\ +\frac{d_1(b_1(a_1c_2-a_2c_1)-c_1(a_1b_2-a_2b_1))}{(a_1b_2-a_2b_1)(a_1c_3-a_3c_1)-(a_1b_3-a_3b_1)(a_1c_2-a_2c_1)} \end{pmatrix}$$