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There are two equations of motion to write (see the hint):

At Mass 1 (the 5kg mass), the forces acting are
     f(t)
     The spring
     The mass itself

We can write:

$$X1(s) * [5s^2 + 10] - X2(s) * [10] = F(s)$$

At Mass 2 (the added mass), the forces acting are
     The spring
     The viscous damper
     The mass itself (but the mass is 0 kg, so ignore it)

We can write:

$$X2(s) * [.2s + 10] - X1(s) * [10] = 0$$

Simplifying, we find that

$$\frac{X2(s)}{F(s)} = \frac{10}{s^3 + 50s^2 + 2s}$$

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There are three equations of motion to write. Call the masses 1, 2, and 3 from left to right.

Mass 1
$$X1(s)*[s^2+s+1] - X2(s) = 0$$

Mass 2
$$X2(s)*[s^2+s+2] - X1(s) - X3(s)*s=0$$

Mass 3
$$X3(s)*[s^2+s+1] - X2(s)*s=0$$

Simplifying, we find that

$$\frac{X3(s)}{F(s)} = \frac{s(s^2+s+1)}{s^6+3s^5+6s^4+8s^3+7s^2+4s+1}$$

I am mostly interested in your ability to write the equations of motion. You will not be expected to solve for X3(s)/F(s) in a problem as algebraically difficult as this on an exam or quiz.

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There are two equations of motion to write. Call the inertias 1 and 2 from left to right. Also let O denote Theta:

Inertia 1
O1(s)*[s^2+5s+6]-O2(s)*[3s+4]=0

Inertia 2
O2(s)*[s^2+5s+5]-O1(s)*[3s+4]=T(s)

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In this case, there are 4 inertias. We must add a ‘zero’ inertia in between K2 and D2 for the usual reasons.
Draw O1 at J1, O2 at J2, O3 at J3, and O4 in between K2 and D2.

Inertia 1
O1(s)*[J1 s^2 + D1 s + K1]-O2(s)*[D1 s + K1] = T(s)

Inertia 2
O2(s)*[J2 s^2 + D1 s + K1+K2] - O1(s)*[D1 s + K1] - O4(s)[K2] = 0

Inertia 3
O3(s)*[J3 s^2 + D2 s + K3] - O4(s)*[D2 s] = 0

Inertia 4 (The ‘added’ inertia)
O4(s)*[D2 s + K2] - O2(s)*K2 - O3(s)*[D2 s] = 0

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