I. A step response of a closed loop system with proportional gain and open loop transfer function \( G(s) = \frac{101}{s^3 + 50s^2 + 10s} \), is given below. If we want to apply P, PI and PID controller to this plant, what are the parameters for these controllers? Use below table for parameter calculations. Find the parameters and show the result in a block diagram form including controller and the plant for all three cases (3 different block diagrams). Find the closed loop (plant, controller) transfer functions of the systems (3 different transfer functions). (40)

II. Satellite attitude control system with velocity feedback is given below. With velocity feedback, continuing output oscillations have been overcome. If \( K/J = 4 \), what value of \( K_h \) will yield the damping ratio of 0.6? (30)

III. Obtain the partial fraction expansion of the following function and apply inverse Laplace transform to get time domain representation of that function. Plot \( f(t) \). (30)

\[
F(s) = \frac{10(s + 2)(s + 7)}{(s + 1)(s + 3)(s + 5)}
\]