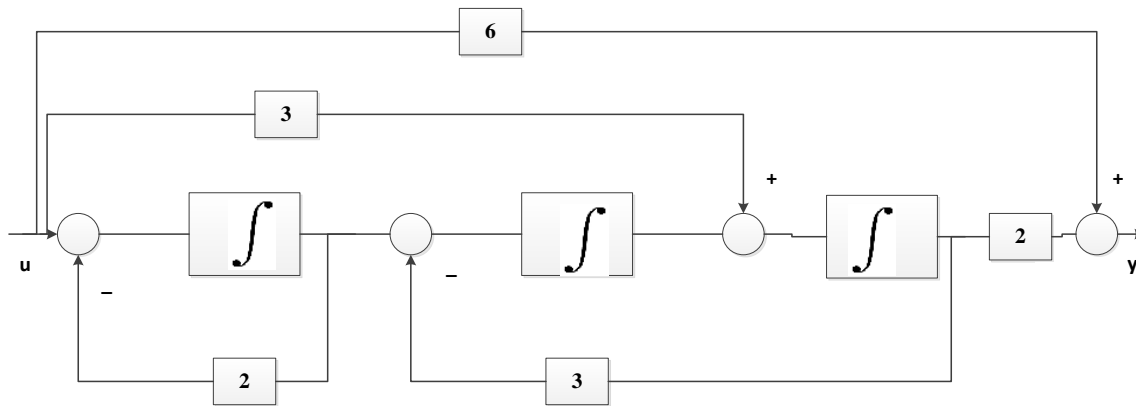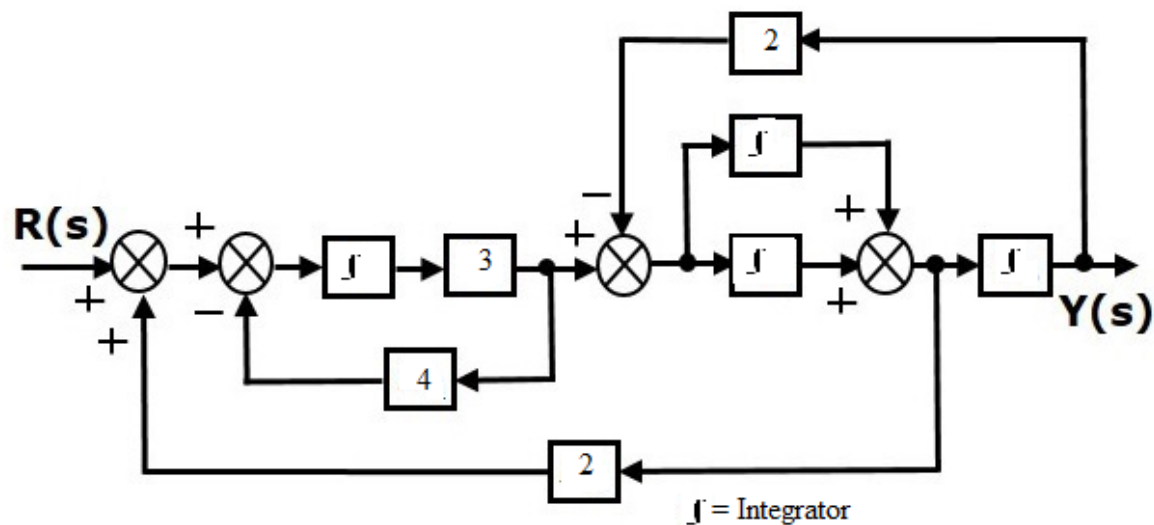(1) Write the state and output equation for the simulation diagram



(2) Write the state and output equation for the following simulation diagram



$\int$ = Integrator

(3) $\dddot{y} + 8\ddot{y} - 6\dot{y} + 2y = 4\ddot{u} - 3\dot{u} - 2u$, find the state and output equation by using the controllable canonical form.

(4) $\dddot{y} + 7\ddot{y} + 16\dot{y} + 12y = 2\dot{u} + u$, find the state and output equation by using the observer canonical form of the given model.