5. The proportional control system of FIGURE 3(a) has an input, θ_1, of 10 units. The uncontrolled input, θ_2, has a value of 50 units, prior to a step change down to 40 units. The result of this disturbance upon the output, θ_o, is shown in FIGURE 3(b).

(a) Calculate the change in offset in the output produced by the step change.

(b) Draw a modified block diagram to show how the offset could be minimised by the inclusion of another control action. Also, show by means of a sketch how the modification might be expected to affect the output response.

(c) Show, by drawing a modified block diagram, how the magnitude of the disturbance could be minimised by the inclusion of a third type of control action.

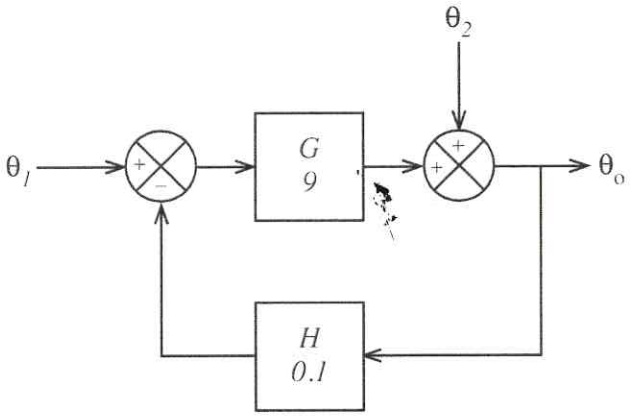

FIG. 3(a)