a. The system reaches equilibrium withing 12 seconds.

b. Then the following stresses are applied.

i. CO is added and its concentration increases to 2.2M

ii. Equilibrium is re-established within 5 seconds.

Where at the 35 second mark the temperature is reduced and equilibrium is reached within 5 seconds

iii. At 40 seconds a catalyst is added.

iv. At 45 seconds COCl2 is added.

v. The volume of the reaction vessel is increased by 10%.

$$CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g) \quad \Delta H = -108kJ/mol$$