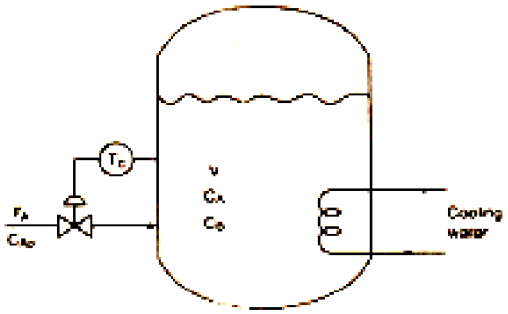
Department of Chemical Engineering
Tutorial Sheet No.4

Subject: Chemical Process Simulation Semester: 7th, Chemical Engineering

Q1. A semi batch reactor is run at constant temperature by varying the rate of addition of one of the reactants A. The irreversible exothermic reaction is first order in reactants A and B.

$$A + B \xrightarrow{k} C$$

The tank is initially filled to its 40% level with pure reactant B at the concentration C_{BO}. Maximum cooling water flow is begun, and reactant A is slowly added to the perfectly stirred vessel. Write the equations describing the system. Solving the equation, sketch the profile of FA, C_A and C_B with time during the batch cycle.



Q2. An isothermal, irreversible reaction $A \xrightarrow{k} B$ takes place in the liquid phase in a constant volume reactor. The mixing is not perfect. Observation of flow pattern indicates that a two tank system with back mixing as shown in Figure. Assuming FR are constant, write the equations describing the system.