1. The reaction rate for the elementary reaction: 2A + B → 2D, is
   A. $-r_A = kC_AC_B$
   B. $-r_A = kC^2_AC_B$
   C. $-r_A = kC_AC_BC_D$
   d. $-r_A = kC^2_AC_BC_D$

2. SO_2 (A) is absorbed into water in a packed column. At a certain location in the column, the bulk conditions are 50°C, 2.0 atm, y_{AG} = 0.085 and x_{AL}=0.001. Equilibrium data for SO_2 between air and water at 50°C is given by y_A = 50 × x_A.
   Experimental values of the local mass transfer coefficients are given by k_L = 0.18 m/h and k_G = 0.040 kmol/h.m².kPa. Then, the flux at the liquid phase is

   A. 99.0 kmol/h.m²
   B. 9.9 kmol/h.m²
   C. 0.99 kmol/h.m²
   D. 45.9 kmol/h.m²

3. The following sketch is for:
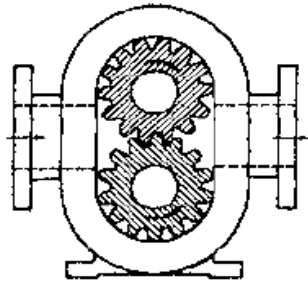
   A. Rotary centrifugal pump
   B. Reciprocating pump
   C. Piston pump
   D. Rotary Positive displacement pump