**Problem 9.1**
A smokestack of height $H = 20$ m releases two gases, dichlorodifluoromethane (Freon 12) and trichloroethene (TCE), each at a rate of 5 kg/min. Freon 12 is conservative. TCE undergoes first-order degradation in the atmosphere at a rate of $k_{TCE} = 0.1$ day$^{-1}$, producing the highly toxic chemical phosgene ($C(=O)Cl_2$). Assume that the wind blows steadily and uniformly at 5 m/s in the positive x direction. The atmospheric turbulence is homogeneous but anisotropic, with the vertical diffusivity, $D_Z = 0.1$ m$^2$s$^{-1}$, smaller than the horizontal diffusivities, $D_X = D_Y = 1$ m$^2$s$^{-1}$. For both gases the ground acts as a no-flux boundary. Find the maximum concentration of Freon and TCE 10-km downwind of the stack.