

## Problem 24

A certain drug is being administered intravenously to a hospital patient. Fluid containing  $5 \text{ mg/cm}^3$  of the drug enters the patient's bloodstream at a rate of  $100 \text{ cm}^3/\text{h}$ . The drug is absorbed by body tissues or otherwise leaves the bloodstream at a rate proportional to the amount present, with a rate constant of  $0.4 \text{ (h)}^{-1}$ .

- (a) Assuming that the drug is always uniformly distributed throughout the bloodstream, write a differential equation for the amount of the drug that is present in the bloodstream at any time.
- (b) How much of the drug is present in the bloodstream after a long time?