Higher Math for Engineers
Review for Exam I

This exam will cover the following topics:

I. **Separable equations.** You should be able to identify a separable linear differential equation and solve it.

Examples of typical problems are: Page 46, problems 12, 14, 16 and 20.

II. **Linear equations.** You should be able to identify a "linear" equation and solve it.

Typical problems are: Page 55, problems 8, 10, 17 and 18.

III. **Exact equations.** You should be able to identify and exact linear differential equation and solve it.

Typical problems are: Page 65, problems 12, 15, 16 and 24.

IV. **Special integrating factors.** Given a linear differential equation in the form

$$M(x, y)\,dx + N(x, y)\,dy = 0$$

which is not exact, you should be able to compute if possible a special integrating factor that depends either only on x or on y and use it to solve the equation.

Typical problems are: Page 71, problems 8, 9, 10, 11.

V. **Conceptual problems.** You will be asked to answer some conceptual questions. The following are examples:

(i) State the defintion of separable linear equation.

(ii) What is a criterion to decide whether an equation is exact?

(iii) What is a special integrating factor?

(iv) What is the order of a linear differential equation?