Fall nnnn

- (a) State the initial value problem that we have been calling (IVP).
- (b) Give the definition of a well-posed IVP.

(c) State a theorem on the existence and uniqueness of solutions to (IVP).

- (60) 2. Single step methods
  - (a) Approximate the solution to  $y' = yt t^2$ ,  $2 \le t \le 3$ , y(2) = 1, using Euler's method with h = 0.5.

(b) Describe the theorem on the (total) error in Euler's method. Comment on its significance.

- (c) Define local truncation error for single-step methods.
- (d) Define the Taylor method of order n and explain why it is not a general purpose method.

(e) Are Runge-Kutta methods general purpose? Why or why not?

(f) Describe RKF45 (or any adaptive single step method).

## (20) 3. Multistep methods

(a) Give a coarse derivation of the Adams-Bashforth explicit multistep methods.

(b) Describe what an implicit multistep method is.