

- 1.) (i) Simple calculations using modular arithmetic; (ii) Solving a calendar problem or clock problem. (Reference: See the handout on modular arithmetic as well as the quiz on “div” and “mod”.)
- 2.) (i) Determine the check digit for an ISBN number. You must know the procedure; the algorithm will not be described in the test. (Reference: See page 598 of the book and Questions 9 and 10 on page 614.); (ii) Briefly discuss the importance of check digits. (Reference: Carefully read Section 16.1.)
- 3.) Florida driver’s license problem. (Reference: See the handout on Florida driver’s license and the corresponding quiz.)
- 4.) Use Vigenère Cipher (the keyword will be specified in the test) to encode a given message. (Reference: study carefully the Vigenère Cipher Example on pages 636 and 637; see also the handout on cryptography. You must know how Vigenère Cipher works; the algorithm will **not** be described in the test.)
- 5.) Write an argument using pigeonhole principle. (Reference: Handout on pigeonhole principle.)
- 6.) A question about various voting procedures for three or more candidate elections. (Reference: Problems 9, 11, 13 on page 365).
- 7.) Explain in your own words the following concepts: Condorcet Winner Criterion, Independence of Irrelevant Alternatives, Pareto Condition, Monotonicity.
- 8.) Explain why, for two candidate elections, majority rule is better than minority rule, dictatorship and imposed rule. Your discussion should include explanations of the three important properties that majority rule satisfies. (Reference: see the discussion on page 341.).