This exam will cover sections 3.1-5.3 in your text. Below is a list of concepts from these sections to which you should pay particular attention in preparation for the exam.

1. Section 3.1, pages 166-181
   (a) Differentiation between observational studies and experiments.
   (b) A sample of a population.
   (c) Definition of a voluntary response sample.
   (d) Be able to identify and take a simple random sample from a population.
   (e) Other types of probability samples listed in the chapter.
   (f) Cautions about sampling such as undercoverage, nonresponse, and bias.

2. Section 3.2, pages 186-199
   (a) Vocabulary words such as experimental units, subjects, and treatments.
   (b) Comparative experiments with control groups.
   (c) Randomized assignment of treatments to units.
   (d) Three principles of experimental design: control, randomization, and replication.
   (e) Identifying statistically significant experimental results.
   (f) Cautions about experiments such as the use of double-blind studies and realistic experiments.

3. Section 4.1, pages 214-218
   (a) Difference between a parameter and a statistic.
   (b) The concepts of randomness and probability.

4. Section 4.2, pages 220-231
   (a) The sample space, $S$, of a random phenomenon.
   (b) An event chosen from a sample space.
   (c) Assigning probabilities to events in a sample space to create a probability model.
   (d) Basic rules of probability.
   (e) Assigning and working with probabilities in a finite sample space.
   (f) Assigning and working with probabilities on intervals of an infinite sample space.
   (g) Working with normal probability distributions.

5. Section 4.3, pages 236-247
   (a) Statistical means and the law of large numbers.
   (b) Making and interpreting sampling distributions.
   (c) The statistical mean $\bar{x}$ as an unbiased estimator of $\mu$.
   (d) The mean and standard deviation of $\bar{x}$ for a SRS of size $n$.
   (e) The central limit theorem.
6. Section 5.1, pages 258-266
   (a) Creation and interpretation of Venn diagrams.
   (b) Multiplication rule for independent events.
   (c) The general addition rule.
   (d) Application of probability rules to specific examples.

7. Section 5.2, pages 269-279
   (a) Properties of a binomial setting.
   (b) The definition of the binomial distribution.
   (c) Formula for the binomial coefficient and application of binomial probability formula.
   (d) The binomial mean and binomial standard deviation.
   (e) Approximating the binomial distribution with the normal distribution.

8. Section 5.3, pages 283-289
   (a) Finding conditional probability from a two-way table.
   (b) Formula for conditional probabilities.
   (c) Determining if two events are independent using conditional probabilities.