Probability and Statistics (MS-251)
Outline Detail

Best way for preparation

1st: i, ii   **2nd:** iv, vi   **3rd:** iii, v

i. Important Definitions

Introduction: Statistics and Data Analysis, Statistical Inference, Samples, Populations, and the Role of Probability. Sampling Procedures, Discrete and Continuous Data, Statistical Modeling, Types of Statistical Studies.

ii. Simple (Conceptual & Formulas)

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

iii. Theoretical Questions (Important & Difficult)

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule.
Random Variables and Probability Distributions.

Probability Distributions: Discrete Probability Distributions, Continuous Probability Distributions.

iv. Mathematical (Simple & Easy)

Fundamental Sampling Distributions: Sampling Distributions and Data Descriptions, Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem.
Sampling Distribution of S2, t-Distribution, F-Quantile and Probability Plots

v. Same Procedure (Difficult to find Hypotheses Statement)

Single Sample & One- and Two-Sample Estimation Problems: Single Sample & One- and Two-Sample Tests of Hypotheses. The Use of P-Values for Decision Making in Testing Hypotheses (Single Sample & One- and Two-Sample Tests).

vi. Mathematical Formula base (Simple & Easy)

Regression: Linear Regression and Correlation, Least Squares and the Fitted Model, Multiple Linear Regression and Certain, Nonlinear Regression Models, Linear Regression Model Using Matrices, Properties of the Least Squares Estimators