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6TH EDITION

OPERATIONS RESEARCH

THEORY AND APPLICATIONS

J K SHARMA

**OPERATIONS RESEARCH
THEORY AND APPLICATIONS**

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- *Operations Research: Problems and Solutions (3rd Edn)*
- *Quantitative Techniques for Managerial Decisions (2nd Edn)*
- *Discrete Mathematics (4th Edn)*
- *Management of Systems*
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OPERATIONS RESEARCH THEORY AND APPLICATIONS

Sixth Edition

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Amity University Uttar Pradesh, Noida*



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OPERATIONS RESEARCH: THEORY AND APPLICATIONS

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Preface to the Sixth Edition

It gives me great pleasure and satisfaction to present the sixth edition of the book *Operations Research: Theory and Applications* to the teachers and students of this subject.

This edition continues to provide readers an understanding of problem-solving methods based on a careful discussion of model formulation, solution procedure and analysis. I hope this easy-to-understand approach would enable readers to develop the required skills and apply operations research techniques to all kinds of decision-making problems.

The text revision in this edition is extensive and in accordance with the objective of enhancing and strengthening the conceptual as well as practical knowledge of readers about various techniques of operations research. A large number of new business-oriented solved as well as practice problems have been added, thus creating a bank of problems that give a better representation of the various operations research techniques.

This edition has a completely new look and feel. I hope this revision will facilitate the teaching of operations research techniques as well as enhance the learning experience for students.

Following are some of the key changes:

- The text of almost each chapter has been reorganized and/or rewritten to make explanations more cogent through relevant and interesting examples. This will provide a more meaningful, easier and effective learning experience.
- Each chapter contains *Preview and Learning Objectives* to guide the students and help them focus their attention on understanding a specific topic under study.
- Most chapters contain *Management Cases* to help students understand various business situations and suggest solutions to managerial issues that are raised while using specific techniques of operations research.
- Each chapter contains *Concept Quizzes* to help students reinforce their understanding of the principles and applications of operations research techniques.
- Explanations are well illustrated with numerous interesting and varied business-oriented examples.
- *Conceptual Questions, Self Practice Problems with Hints and Answers* are given in each chapter to enable students to learn at their own pace.
- Complete conformity to the latest trends of questions appearing in universities and professional examinations.
- *Appendices*, in most chapters, provide basic theoretical support to the development of specific techniques used to solve decision-making problems in that chapter.
- *References* to questions set in examinations of various Indian universities have been updated.

The book is intended to serve as a core textbook for students of MBA/PGDBM, MCom, CA, ICWA and those who need to understand the basic concepts of operations research and apply results directly to real-life business problems. The book also suits the requirement of students of MA/MSc (Math, Statistics, Operations Research), MCA, MIT, MSc (IT), BE/BTech (Computer Science), AMIE who need both theoretical and practical knowledge of operations research.

It would also prove to be a great asset for those preparing for IAS, NET, ISI and other competitive examinations.

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I express my heartfelt gratitude to Founder President Dr. Ashok K Chauhan and Chancellor Mr. Atul K Chauhan, Amity University Uttar Pradesh, Noida for their inspiration, overwhelming support, and motivation.

The support of Prof. B Shukla, Vice-Chancellor, Amity University Uttar Pradesh, Noida; Prof. Sanjeev Bansal, Dean, Faculty of Management Studies, Amity Business School, Amity University Uttar Pradesh, Noida were very reassuring and invaluable. I thank them from the core of my heart.

In preparing the text of this book, I have benefitted immensely by referring to many books and publications. I express my gratitude to those authors, publications, publishers and institutions, most of them have been listed in the references. I would also like to thank Wikipedia, (www.wikipedia.org as accessed on 6/5/09) from where I have taken quotes that I have placed at the beginning of each chapter. If anybody is left out inadvertently, I seek their pardon.

I am thankful to my esteemed colleagues, and students who have contributed to this book through their valuable advice and feedback. Last but not the least I thank God Almighty and my family for being there whenever I need them.

I hope that the book serves the purpose for its readers and that I will continue to get their support and suggestions. I retain the responsibility of errors of any kind in the book. Suggestions and comments to improve the book in content and in style are always welcome and will be appreciated and acknowledged.

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Prof (Dr.) J K Sharma

Preface to the First Edition

The primary objective in writing this book is to provide the readers the insight into structures and processes that Operations Research can offer and the enormous practical utility of its various techniques.

The aim is to explain the concepts and simultaneously to develop in readers an understanding of problem-solving methods based upon a careful discussion of model formulation, solution procedures and analysis. To this end, numerous solved business-oriented examples have been presented throughout the text. Unsolved *Self Practice Problems with Hints and Answers*, and *Review Questions* have been added in each chapter to strengthen the conceptual as well as practical knowledge of the reader.

The book is designed to be self-contained and comprises of 29 chapters divided into four parts and Appendices A and B. Topics providing theoretical support to certain results used for solving business problems in Part II are discussed in Part IV. The book is intend to serve as a core text primarily for students of MBA/PGDBM, MCom, CA, ICWA who need to understand basic concepts of operations research and apply results directly to real-life business problems. The book also suits the requirements of students appearing for MA/MSc (Maths, Statistics, Operations Research), MCA, BE/BTech (Computer Science) and AMIE, who need both theoretical and practical knowledge of operations research techniques, as well as for those preparing for IAS, NET, ISI and other competitive examinations.

I hope that the presentation and sequence of chapters have made the text interesting and lucid. In writing this book I have benefitted immensely by referring to many books and publications. I express my gratitude to all such authors, publishers and institutions; many of them have been listed in the references. If anybody has been left out inadvertently, I seek their pardon.

I express my sincere gratitude to my teachers Prof. Kanti Swarup and Dr S D Sharma for their blessings and inspiration. I wish to acknowledge my sincere thanks to my students, friends and colleagues, particularly to Prof M P Gupta and Prof A S Narag for their valuable suggestions and encouragement during the preparation of this text. I would like to thank the publishers for the efficient and thoroughly professional way in which the whole project was managed. In the end let me thank my wife and children for the unflagging support and encouragement they gave me while I worked on this book.

Any suggestions to improve the book in contents or in style are always welcome and will be appreciated and acknowledged.

J K Sharma

Contents

<i>Preface to the Sixth Edition</i>	v
<i>Preface to the First Edition</i>	vi
Chapter 1 Operations Research: An Introduction	1–24
1.1 Operations Research – A Quantitative Approach to Decision-Making	2
1.2 The History of Operations Research	2
1.3 Definitions of Operations Research	4
1.4 Features of Operations Research Approach	5
1.5 Operations Research Approach to Problem Solving	6
Conceptual Questions A	7
1.6 Models and Modelling in Operations Research	7
• <i>Classification Based on Structure</i>	8
• <i>Classification Based on Function (or Purpose)</i>	10
• <i>Classification Based on Time Reference</i>	10
• <i>Classification Based on Degree of Certainty</i>	10
• <i>Classification Based on Method of Solution or Quantification</i>	11
1.7 Advantages of Model Building	11
1.8 Methods for Solving Operations Research Models	11
1.9 Methodology of Operations Research	12
1.10 Advantages of Operations Research Study	14
1.11 Opportunities and Shortcomings of the Operations Research Approach	14
1.12 Features of Operations Research Solution	15
1.13 Applications of Operations Research	15
1.14 Operations Research Models in Practice	16
1.15 Computer Software for Operations Research	17
Conceptual Questions B	18
Chapter Summary	19
Chapter Concepts Quiz	19
Case Study	20
Puzzles in Operations Research	22
Chapter 2 Linear Programming: Applications and Model Formulation	25–67
2.1 Introduction	26
2.2 Structure of Linear Programming Model	26
• <i>General Structure of an LP Model</i>	26
• <i>Assumptions of an LP Model</i>	27
2.3 Advantages of Using Linear Programming	27
2.4 Limitations of Linear Programming	27
2.5 Application Areas of Linear Programming	28
2.6 General Mathematical Model of Linear Programming Problem	29
2.7 Guidelines on Linear Programming Model Formulation	30
2.8 Examples of LP Model Formulation	30
• <i>Examples on Production</i>	30
• <i>Examples on Marketing</i>	41
• <i>Examples on Finance</i>	43
• <i>Examples on Agriculture</i>	49
• <i>Example on Transportation</i>	51
• <i>Examples on Personnel</i>	53
Conceptual Questions	55
Self Practice Problems	56
Hints and Answers	61

Chapter Summary	64
Chapter Concepts Quiz	65
Case Study	66

Chapter 3 Linear Programming: The Graphical Method **68–99**

3.1	Introduction	69
3.2	Important Definitions	69
3.3	Graphical Solution Methods of LP Problems	69
	• <i>Extreme Point Solution Method</i>	70
	• <i>Examples on Maximization LP Problem</i>	70
	• <i>Examples on Minimization LP Problem</i>	75
	• <i>Examples on Mixed Constraints LP Problem</i>	78
	• <i>Iso-Profit (Cost) Function Line Method</i>	86
	• <i>Comparison of Two Graphical Solution Methods</i>	87
3.4	Special Cases in Linear programming	87
	• <i>Alternative (or Multiple) Optimal Solutions</i>	87
	• <i>Unbounded Solution</i>	88
	• <i>Infeasible Solution</i>	90
	• <i>Redundancy</i>	92
	Conceptual Questions	92
	Self Practice Problems	92
	Hints and Answers	96
	Chapter Summary	97
	Chapter Concepts Quiz	97
	Case Study	98

Chapter 4 Linear Programming: The Simplex Method **100–144**

4.1	Introduction	101
4.2	Standard form of an LP Problem	101
4.3	Simplex Algorithm (Maximization Case)	103
4.4	Simplex Algorithm (Minimization Case)	112
	• <i>Two-Phase Method</i>	114
	• <i>Big-M Method</i>	119
	Self Practice Problems A	127
	Hints and Answers	130
4.5	Some Complications and Their Resolution	131
	• <i>Unrestricted Variables</i>	131
	• <i>Tie for Entering Basic Variable (Key Column)</i>	134
	• <i>Tie for Leaving Basic Variable (Key Row) – Degeneracy</i>	134
4.6	Types of Linear Programming Solutions	135
	• <i>Alternative (Multiple) Optimal Solutions</i>	136
	• <i>Unbounded Solution</i>	137
	• <i>Infeasible Solution</i>	138
	Conceptual Questions	139
	Self Practice Problems B	139
	Hints and Answers	141
	Chapter Summary	142
	Chapter Concepts Quiz	142
	Case Study	143

Chapter 5 Duality in Linear Programming **145–168**

5.1	Introduction	146
5.2	Formulation of Dual Linear Programming Problem	146
	• <i>Symmetrical Form</i>	146
	• <i>Economic Interpretation of Dual Variables</i>	147
	• <i>Economic Interpretation of Dual Constraints</i>	148
	• <i>Rules for Constructing the Dual from Primal</i>	148
	Self Practice Problems A	152
	Hints and Answers	152
5.3	Standard Results on Duality	153
	• <i>Principle of Complementary Slackness</i>	153
5.4	Managerial Significance of Duality	153

5.5 Advantages of Duality	159
Conceptual Questions	159
Self Practice Problems B	159
Hints and Answers	161
Chapter Summary	163
Chapter Concepts Quiz	163
Case Study	165
Appendix: Theorems of Duality	166
Chapter 6 Sensitivity Analysis in Linear Programming	169–200
6.1 Introduction	170
6.2 Sensitivity Analysis	170
• <i>Change in Objective Function Coefficient (c_j)</i>	170
• <i>Change in the Availability of Resources (b_j)</i>	177
• <i>Change in the Input-Out Coefficients (a_{ij}'s)</i>	184
• <i>Addition of a New Variable (Column)</i>	188
• <i>Addition of a New Constraint (Row)</i>	189
Conceptual Questions	196
Self Practice Problems	196
Hints and Answers	198
Chapter Summary	199
Chapter Concepts Quiz	199
Case Study	200
Chapter 7 Integer Linear Programming	201–235
7.1 Introduction	202
7.2 Types of Integer Programming Problems	202
7.3 Enumeration and Cutting Plane Solution Concept	203
7.4 Gomory's All Integer Cutting Plane Method	203
• <i>Method for Constructing Additional Constraint (Cut)</i>	204
• <i>Steps of Gomory's All Integer Programming Algorithm</i>	204
Self Practice Problems A	212
Hints and Answers	215
7.5 Gomory's Mixed-Integer Cutting Plane Method	216
• <i>Method for Constructing Additional Constraint (Cut)</i>	216
• <i>Steps of Gomory's Mixed-Integer Programming Algorithm</i>	218
7.6 Branch and Bound Method	221
7.7 Applications of Zero-One Integer Programming	228
• <i>Capital Budgeting Problem</i>	228
• <i>Fixed Cost (or Charge) Problem</i>	229
• <i>Plant Location Problem</i>	230
Conceptual Questions	231
Self Practice Problems B	231
Hints and Answers	232
Chapter Summary	232
Chapter Concepts Quiz	232
Case Study	234
Chapter 8 Goal Programming	236–255
8.1 Introduction	237
8.2 Difference Between LP and GP Approach	237
8.3 Concept of Goal Programming	237
• <i>Distinction among Objectives, Goals and Constraints</i>	238
8.4 Goal Programming Model Formulation	238
• <i>Single Goal with Multiple Subgoals</i>	238
• <i>Equally Ranked Multiple Goals</i>	239
• <i>Ranking and Weighting of Unequal Multiple Goals</i>	240
• <i>General GP Model</i>	241
• <i>Steps to Formulate GP Model</i>	141

- 8.5 Graphical Solution Method for Goal Programming 241
- 8.6 Modified Simplex Method of Goal Programming 245
- 8.7 Alternative Simplex Method for Goal Programming 247
- Conceptual Questions 250
- Self Practice Problems 250
- Chapter Summary 252
- Chapter Concepts Quiz 253
- Case Study 254

Chapter 9 Transportation Problem **256–309**

- 9.1 Introduction 257
- 9.2 Mathematical Model of Transportation Problem 257
 - *General Mathematical Model of Transportation Problem* 258
- 9.3 The Transportation Algorithm 259
- 9.4 Methods for Finding Initial Solution 259
 - *North-West Corner Method (NWCM)* 259
 - *Least Cost Method (LCM)* 260
 - *Vogel's Approximation Method (VAM)* 262
- Conceptual Questions A 265
- Self Practice Problems A 265
- Hints and Answers 265
- 9.5 Test for Optimality 266
 - *Dual of Transportation Model* 266
 - *Economic Interpretation of u_i 's and v_j 's* 267
 - *Steps of MODI Method (Transportation Algorithm)* 268
 - *Close-Loop in Transportation Table and its Properties* 269
- Conceptual Questions B 278
- Self Practice Problems B 278
- Hints and Answers 280
- 9.6 Variations in Transportation Problem 280
 - *Unbalanced Supply and Demand* 280
 - *Degeneracy and its Resolution* 283
 - *Alternative Optimal Solutions* 287
 - *Prohibited Transportation Routes* 290
- 9.7 Maximization Transportation Problem 294
- 9.8 Trans-shipment Problem 296
- Conceptual Questions C 298
- Self Practice Problems C 298
- Hints and Answers 302
- Chapter Summary 304
- Chapter Concepts Quiz 304
- Case Study 305
- Appendix: Theorems and Results 307

Chapter 10 Assignment Problem **310–338**

- 10.1 Introduction 311
- 10.2 Mathematical Models of Assignment Problem 311
- 10.3 Solution Methods of Assignment Problem 312
 - *Hungarian Method for Solving Assignment Problem* 312
- Conceptual Questions A 318
- Self Practice Problems A 318
- Hints and Answers 320
- 10.4 Variations of the Assignment Problem 320
 - *Multiple Optimal Solutions* 320
 - *Maximization Case in Assignment Problem* 320
 - *Unbalanced Assignment Problem* 323
 - *Restrictions on Assignments* 323
- Conceptual Questions B 327
- Self Practice Problems B 327
- Hints and Answers 329

10.5	A Typical Assignment Problem	330
10.6	Travelling Salesman Problem	331
	Self Practice Problems C	334
	Hints and Answers	335
	Chapter Summary	335
	Chapter Concepts Quiz	335
	Case Study	337
	Appendix: Important Results and Theorems	338

Chapter 11 Decision Theory and Decision Trees **339–381**

11.1	Introduction	340
11.2	Steps of Decision-Making Process	340
11.3	Types of Decision-Making Environments	341
11.4	Decision-Making Under Uncertainty	342
	• <i>Optimism (Maximax or Minimin) Criterion</i>	342
	• <i>Pessimism (Maximin or Minimax) Criterion</i>	342
	• <i>Equal Probabilities (Laplace) Criterion</i>	342
	• <i>Coefficient of Optimism (Hurwicz) Criterion</i>	343
	• <i>Regret (Savage) Criterion</i>	343
	Conceptual Questions A	346
	Self Practice Problems A	346
	Hints and Answers	347
11.5	Decision-Making Under Risk	347
	• <i>Expected Monetary Value (EMV)</i>	347
	• <i>Expected Opportunity Loss (EOL)</i>	350
	• <i>Expected Value of Perfect Information (EVPI)</i>	351
11.6	Posterior Probabilities and Bayesian Analysis	360
	Conceptual Questions B	362
	Self Practice Problems B	362
	Hints and Answers	364
11.7	Decision Trees Analysis	365
11.8	Decision-Making with Utilities	373
	• <i>Utility Functions</i>	374
	• <i>Utility Curve</i>	374
	• <i>Construction of Utility Curves</i>	375
	Self Practice Problems C	376
	Hints and Answers	378
	Chapter Summary	378
	Chapter Concepts Quiz	379
	Case Study	380

Chapter 12 Theory of Games **382–416**

12.1	Introduction	383
12.2	Two-Person Zero-Sum Games	384
12.3	Pure Strategies (Minimax and Maximin Principles): Games with Saddle Point	386
	• <i>Rules to Determine Saddle Point</i>	386
	Conceptual Questions A	388
	Self Practice Problems A	389
	Hints and Answers	390
12.4	Mixed Strategies: Games without Saddle Point	390
12.5	The Rules (Principles) of Dominance	391
12.6	Solution Methods Games without Saddle Point	392
	• <i>Algebraic Method</i>	392
	• <i>Arithmetic Method</i>	400
	• <i>Matrix Method</i>	402
	• <i>Graphical Method</i>	403
	• <i>Linear Programming Method</i>	408
	Conceptual Questions B	411
	Self Practice Problems B	412
	Hints and Answers	414
	Chapter Summary	415
	Chapter Concepts Quiz	415

Chapter 13 Project Management: PERT and CPM 417–473

- 13.1 Introduction 418
- 13.2 Basic Differences Between PERT and CPM 418
 - *Significance of Using PERT/CPM* 418
- 13.3 Phases of Project Management 419
- 13.4 PERT/CPM Network Components and Precedence Relationships 420
 - *Rules for AOA Network Construction* 422 • *Errors and Dummies in Network* 423
- Conceptual Questions A 426
- Self Practice Problems A 426
- 13.5 Critical Path Analysis 428
 - *Forward Pass Method (For Earliest Event Time)* 428
 - *Backward Pass Method (For Latest Allowable Event Time)* 429
 - *Float (Slack) of an Activity and Event* 429 • *Critical Path* 430
- Conceptual Questions B 434
- Self Practice Problems B 434
- Hints and Answers 437
- 13.6 Project Scheduling with Uncertain Activity Times 437
 - *Estimation of Project Completion Time* 438
- Conceptual Questions C 441
- Self Practice Problems C 441
- Hints and Answers 445
- 13.7 Project Time-Cost Trade-Off 445
 - *Project Crashing* 445 • *Time-Cost Trade-Off Procedure* 445
- Self Practice Problems D 454
- Hints and Answers 457
- 13.8 Updating of the Project Progress 458
- 13.9 Resource Allocation 459
 - *Resource Levelling* 459 • *Resource Smoothing* 459
- Self Practice Problems E 469
- Chapter Summary 470
- Chapter Concepts Quiz 471
- Case Study 472

Chapter 14 Deterministic Inventory Control Models 474–540

- 14.1 Introduction 475
- 14.2 The Meaning of Inventory Control 475
- 14.3 Functional Role of Inventory 475
- 14.4 Reasons for Carrying Inventory 477
- 14.5 Factors Involved in Inventory Problem Analysis 477
 - *Inventory Cost Components* 479 • *Demand for Inventory Items* 480
 - *Replenishment Lead Time* 480
 - *Planning Period* 481
- 14.6 Inventory Model Building 481
 - *Steps of Inventory Model Building* 481
 - *Replenishment Order Size Decisions and Concept of EOQ* 481
 - *Classification of EOQ Models* 481
- 14.7 Single Item Inventory Control Models without Shortages 482
- Conceptual Questions A 491
- Self Practice Problems A 492
- Hints and Answers 493
- 14.8 Single Item Inventory Control Models with Shortages 494
- Conceptual Questions B 501
- Self Practice Problems B 501
- Hints and Answers 501

14.9 Multi-Item Inventory Models with Constraints	502
Self Practice Problems C	507
14.10 Single Item Inventory Control Models with Quantity Discounts	507
Self Practice Problems D	511
Hints and Answers	512
14.11 Inventory Control Models with Uncertain Demand	513
• <i>Reorder Level with Constant Demand</i>	513
• <i>Service Level</i>	514
• <i>Additional Stocks</i>	515
14.12 Information Systems for Inventory Control	518
• <i>The Q-System with Uncertain Demand</i>	518
• <i>The Q-system with Uncertain Demand and Lead Time</i>	524
• <i>Application of Q-System: Two-Bin System</i>	524
• <i>The P-System with Uncertain Demand</i>	525
• <i>Comparison Between Q-system and P-System</i>	527
Conceptual Questions C	529
Self Practice Problems E	529
Hints and Answers	530
14.13 Selective Inventory Control Techniques	532
Conceptual Questions D	536
Self Practice Problems F	536
Chapter Summary	537
Chapter Concepts Quiz	537
Case Study	538

Chapter 15 Probabilistic Inventory Control Models

541–558

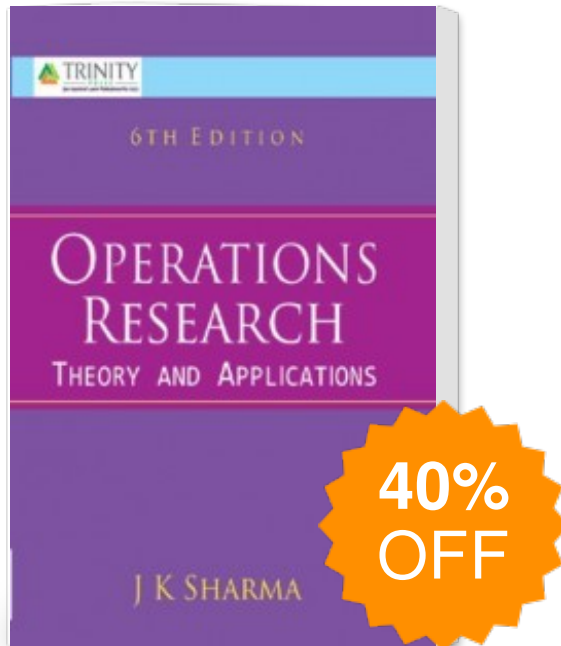
15.1 Introduction	542
15.2 Instantaneous Demand Inventory Control Models without Set-Up Cost	542
Conceptual Questions A	551
Self Practice Problems A	551
Hints and Answers	552
15.3 Continuous Demand Inventory Control Models without Set-Up Cost	552
15.4 Instantaneous Demand Inventory Control Model with Set-Up Cost	556
Conceptual Questions B	557
Self Practice Problems B	557
Hints and Answers	558
Chapter Summary	558

Chapter 16 Queuing Theory

559–612

16.1 Introduction	560
16.2 The Structure of a Queuing System	561
• <i>Calling Population Characteristics</i>	561
• <i>Queuing Process</i>	563
• <i>Queue Discipline</i>	564
• <i>Service Process (or Mechanism)</i>	564
16.3 Performance Measures of a Queuing System	566
• <i>Transient-State and Steady-State</i>	566
• <i>Relationships among Performance Measures</i>	567
16.4 Probability Distributions in Queuing Systems	568
• <i>Distribution of Arrivals (Pure Birth Process)</i>	568
• <i>Distribution of Interarrival Times</i>	569
• <i>Distribution of Departures (Pure Death Process)</i>	569
• <i>Distribution of Service Times</i>	569
Conceptual Questions A	570
16.5 Classification of Queuing Models	570
• <i>Solution of Queuing Models</i>	570
16.6 Single-Server Queuing Models	571
Conceptual Questions B	580
Self Practice Problems A	580
Hints and Answers	582

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