CONTENTS

3.4 Dialing Services 34
   3.4.1 Automatic Dialing 34
   3.4.2 Speed Dialing 35
   3.4.3 Callback, Redial and Inward Dialing 36
3.5 Screening Services 37
3.6 Interrupt Services 38
3.7 Mass Call 39
3.8 Universal Personal Telecommunications Number 40
3.9 Interactive Voice Response Techniques 43
3.10 Other Telephone Services 43
3.11 Mobile Telecommunications Services 46
3.12 Concluding Remarks 50
Review Questions 51
References 52

4 GPRS Tunneling Protocol Extension 53
   4.1 The GTP’ Protocol 53
      4.1.1 The GTP’ Message Formats 54
      4.1.2 Echo Message 57
      4.1.3 Version Not Supported Message and Node Alive Message 57
      4.1.4 The Redirection Message 58
      4.1.5 Data Record Transfer Message 58
   4.2 Connection Setup Procedure 59
   4.3 CDR Transfer Procedure 60
   4.4 Prepaid Quota Management 62
      4.4.1 PQM Message Types 62
   4.5 Prepaid Quota Management Procedure 64
   4.6 Concluding Remarks 66
Review Questions 66
References 67

5 Mobile Charging Protocols 69
   5.1 Customized Application for the Mobile Network Enhanced Logic (CAMEL) 69
   5.2 Remote Authentication Dial In User Service (RADIUS) 72
   5.3 Diameter 74
   5.4 Diameter-based Offline Charging 76
      5.4.1 Offline Charging Message Formats 77
      5.4.2 Offline Charging Procedures 78
   5.5 Diameter-based Online Charging 80
      5.5.1 Online Charging Message Formats 80
      5.5.2 Online Charging Procedures 82
   5.6 Session Initiation Protocol: IMS Charging Headers 87
      5.6.1 P-Charging-Function-Addresses 87
      5.6.2 P-Charging-Vector 87