

Contents

| | |
|---|-----------|
| 1. Normal or reference values | 1 |
| Variations in health and disease | 4 |
| Control of laboratory accuracy | 5 |
| General laboratory practice | 6 |
| 2. Colorimetry, spectrophotometry and nephelometry | 12 |
| Measurement of absorbance | 13 |
| Wavelength and absorbance | 15 |
| Types of instruments | 16 |
| 3. Automatic analysis | 23 |
| The continuous flow analyser | 23 |
| Sequential multiple analysis | 30 |
| Discrete analysers | 31 |
| 4. Specimen preparation and data handling | 36 |
| Blood specimens | 37 |
| Urine specimens | 40 |
| CSF specimens | 41 |
| Handling of infected samples | 41 |
| Laboratory records and data management | 42 |
| 5. Electrolytes | 45 |
| Acid-base status | 45 |
| Blood pH and associated measurements | 48 |
| Plasma bicarbonate | 50 |
| Chloride | 52 |
| Sodium and potassium | 53 |
| Calcium | 57 |
| Magnesium | 59 |
| Inorganic phosphate | 59 |

| | |
|--|------------|
| 6. Organic constituents | 62 |
| Urea | 63 |
| Creatinine | 67 |
| Glucose | 71 |
| Galactose | 75 |
| Uric acid | 76 |
| Bilirubin | 80 |
| Lactate | 87 |
| 7. Enzymes in blood | 91 |
| Alkaline phosphatase | 95 |
| Acid phosphatase | 98 |
| γ -Glutamyl transferase | 100 |
| Aspartate and alanine transaminases | 102 |
| Lactate dehydrogenase | 107 |
| Amylase | 111 |
| 8. Special constituents and drugs | 115 |
| Blood alcohol | 117 |
| Blood barbiturates | 118 |
| Screening of urine for drugs | 125 |
| Bromide in serum | 130 |
| Chlorate in gastric aspirate | 131 |
| Carboxyhaemoglobin in blood | 132 |
| Methaemalbumin | 133 |
| Iron poisoning | 134 |
| Lithium | 135 |
| Methaqualone in serum | 136 |
| Paraquat and diquat | 137 |
| Paracetamol in blood | 137 |
| Salicylates | 138 |
| 9. Proteins | 141 |
| Kjeldahl method | 141 |
| Specific gravity methods | 142 |
| Biuret method | 144 |
| Albumin by dye binding | 145 |
| Albumin by rocket immunoelectrophoresis | 146 |
| Electrophoretic separation | 149 |
| Immunoglobulins | 155 |
| Abnormal proteins | 159 |
| Immunoelectrophoresis | 162 |
| Urine proteins | 164 |
| Selectivity index | 165 |

| | |
|--|------------|
| 10. Blood lipids | 167 |
| Lipoprotein functions and normal values | 167 |
| Hyperlipidaemias | 169 |
| Cholesterol | 173 |
| Triglyceride | 174 |
| HDL – cholesterol | 177 |
| 11. Steroid analyses | 178 |
| Urinary 17-oxosteroids | 178 |
| Urinary 17-oxogenic steroids | 181 |
| Pregnanetriol | 183 |
| Kober chromogens (oestriol) in pregnancy urine | 185 |
| Plasma 11-hydroxycorticosteroids | 187 |
| 12. The identification of amino acids and sugars by thin-layer chromatography | 190 |
| Materials and apparatus | 190 |
| Amino acid chromatography | 193 |
| Two-way amino acid chromatography | 197 |
| Sugar chromatography | 200 |
| 13. Quantitative faecal analyses and metabolic studies | 205 |
| Total fat | 206 |
| Nitrogen | 208 |
| Inorganic constituents by dry analysis | 211 |
| Chromium sesquioxide | 212 |
| Metabolic balance studies | 214 |
| 14. Cerebrospinal fluid | 216 |
| Total protein | 216 |
| Immunoglobulin | 218 |
| Glucose and chloride | 218 |
| 15. Function tests | 220 |
| Glucose tolerance test | 220 |
| Augmented insulin tolerance test | 221 |
| Lactose tolerance test | 223 |
| Sweat test | 224 |
| Pentagastrin test | 226 |
| Pancreatic function test | 228 |
| Bromsulphthalein test | 230 |
| D-xylose absorption test | 233 |
| Vitamin A absorption test | 235 |
| Ascorbic acid saturation test | 237 |

| | |
|---|------------|
| Pyruvate metabolism test | 239 |
| Urine concentration tests | 241 |
| Urine acidification test | 242 |
| Creatinine clearance | 243 |
| Urea clearance | 245 |
| 5-Hydroxyindolylacetic acid (5-HIAA) | 246 |
| 4-Hydroxy-3-methoxy mandelic acid (VMA) | 247 |
| Tests to exclude Cushing's syndrome | 249 |
| Test to exclude Addison's disease | 250 |
| Lecithin/sphingomyelin ratio | 250 |
| 16. Qualitative tests | 255 |
| Urine protein | 256 |
| Bence – Jones protein | 257 |
| Reducing substances | 258 |
| Ketone bodies | 260 |
| pH | 261 |
| Specific gravity and osmolality | 261 |
| Bilirubin | 262 |
| Urobilin and urobilinogen | 263 |
| Porphobilinogen | 264 |
| Porphyrins | 265 |
| Haemoglobin and haemoglobin derivatives | 266 |
| Myoglobin | 267 |
| Melanin and melanogen | 267 |
| Cystine | 268 |
| Spectroscopy | 268 |
| Pigmented urines | 270 |
| Faecal occult blood | 271 |
| Porphyrins | 272 |
| Tryptic activity | 272 |
| Analysis of calculi | 274 |
| 17. Volumetric — SI units | 277 |
| The change to SI units | 278 |
| Volumetric solutions | 280 |
| pH and hydrogen ion concentration | 281 |
| Preparation of standard acids and bases | 281 |
| Index | 287 |