Contents

SECTION 1: QUALITATIVE ANALYSIS

1. Reactions of Carbohydrates 3

Classification *3*
Reactions of Monosaccharides *4*
Reactions of Disaccharides *11*
Reactions of Polysaccharides *15*
Reactions of Starch *15*
Identification of Unknown Carbohydrates *17*
Questions *18*
Reagent Preparation *18*

2. Reactions of Proteins 19

Precipitation Reactions of Proteins *19*
Color Reactions of Proteins and Amino Acids *25*
Specific Color Reactions used to Identify the Side Chain (R)
Groups of Amino Acids *27*
Reactions of Albumin *32*
Reactions of Casein *32*
Identification of Unknown Proteins *34*
Reactions of Gelatin *34*
Questions *35*
Reagent Preparation *35*

3. Reactions of Lipids 37

General Reactions of Lipids *37*
Reactions of Fats and Fatty Acids *37*
Cholesterol *39*
Questions *41*
Reagent Preparation *41*

4. Reactions of Urea 42

General Reactions of Urea *42*
Questions *44*
Reagent Preparation *44*

5. Reactions of Creatinine 45

General Reactions of Creatinine *45*
Questions *46*
Reagent Preparation *46*

6. Reactions of Uric Acid **47**
General Reactions of Uric Acid *47*
Questions *49*
Reagent Preparation *49*

7. Schemes for Identification of Biologically Important Compounds **50**
For Biologically Important Carbohydrate Substances Comprising Glucose, Fructose, Sucrose, Lactose, Maltose *50*
For Biologically Important Substances Comprising Glucose, Fructose, Sucrose, Lactose, Maltose, Albumin, Urea, Uric Acid and Creatinine *51*
For Biologically Important Substances Comprising Glucose, Fructose, Sucrose, Lactose, Maltose, Albumin, Casein, Urea, Uric Acid and Creatinine *52*

8. Urine Analysis **53**
Analysis of Normal Constituents of Urine *53*
Analysis of Abnormal Constituents of Urine *60*
Questions *66*
Reagent Preparation *66*

9. Identification of Hemoglobin Derivatives **67**
Spectroscopic Examination of Hemoglobin Pigments *67*
Identification of Hemoglobin Pigment by Microscopy *71*
Questions *72*
Reagent Preparation *72*

10. Reactions of Milk **74**
Precipitation of Casein from Milk *74*
Questions *75*
Reagent Preparation *75*

SECTION 2: QUANTITATIVE ANALYSIS

11. Introduction to Quantitative Analysis **79**
Principles of Colorimetry *79*
Components of Photoelectric Colorimeter *83*
Measurement in a Photoelectric Colorimeter *83*
Questions *84*

12. Determination of Glucose **85**
Determination of Glucose Concentration *85*
Glucose Tolerance Test *88*
Questions *91*
Reagent Preparation *91*

13. Determination of Urea **93**
Urea *93*
Questions *96*
Reagent Preparation *96*

14. Determination of Creatinine **98**
Creatinine *98*
Questions *101*
Reagent Preparation *101*

15. Determination of Total Protein and Albumin **103**
Methods of Protein Estimation *103*
Determination of Albumin *104*
Questions *105*
Reagent Preparation *106*

16. Determination of Total Cholesterol **107**
Cholesterol *107*
Questions *109*
Reagent Preparation *109*

17. Determination of Uric Acid **110**
Uric Acid *110*
Questions *112*
Reagent Preparation *112*

18. Determination of Bilirubin **114**
Methods *114*
Interpretation *116*
Jaundice *117*
Questions *117*
Reagent Preparation *117*

19. Determination of Transaminases **118**
Transaminases *118*
Questions *122*
Reagent Preparation *122*

20. Determination of Alkaline Phosphatase **124**
Methods *124*
Isoenzymes of Alkaline Phosphatase *126*
Questions *126*
Reagent Preparation *126*

21. Determination of Total Calcium **128**
Calcium *128*
Questions *131*
Reagent Preparation *132*

22. Determination of Phosphate **133**
Questions *136*
Reagent Preparation *136*

SECTION 3: CHARTS

23. Charts **141**
Acid Base Disorders *141*
Jaundice *145*
Diabetes Mellitus *149*
Inborn Errors of Metabolism *155*
Porphyrias *161*
Vitamins and Minerals *163*
Tumor Markers *166*
Water and Electrolytes *167*
Kidney Diseases *168*
Biochemical Diagnosis of Myocardial Infarction *170*
Enzymology *172*

SECTION 4: SPOTTERS

24. Spotters **177**
Instruments *177*
Reagents *183*
Indicators *185*
Crystals *186*
Separation Techniques *188*
Graphs *191*
Tests *195*
Nutrition *203*
Spectroscopy *207*
Conceptual Questions *208*

SECTION 5: OBJECTIVE STRUCTURED PRACTICAL EXAMINATION

25. Objective Structured Practical Examination: Model Questions **221**
General Guidelines *221*

Index *241*