

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
REVISED SYLLABUS FOR DIPLOMA OF MEDICAL TECHNOLOGY
(EFFECTIVE FROM JULY -2014)

Paper IV: CLINICAL BIOCHEMISTRY

SECTION – I INTRODUCTION

1) GENERAL LABORATORY TECHNIQUES:

- i) Important properties of water
- ii) Balances and weighing
- iii) Units of measurement
- iv) Preparation of solution
- v) H⁺ concentration and pH
- vi) Acid and Base,
- vii) Buffers and buffer action
- viii) Indicators
- ix) Osmosis and osmotic pressure
- x) Safety in the Clinical Laboratory

2) ANALYTICAL PROCEDURES :

- i) Photometry: Introduction, Principle of absorption of radiation. The Beer-Lambert's law and its applications in clinical chemistry.
- ii) Electrophoresis: Introduction, Principle, basic components, types.

3) INSTRUMENTATION:

- i) Principle,
- ii) Basic components and use in biochemistry of the following:
 - (1) PH meter
 - (2) Colorimeter
 - (3) Spectrophotometer
 - (4) Flame photometer
 - (5) Centrifuges

4) AUTOMATION:

- i) Principles
- ii) Types and Applications

5) QUALITY CONTROL IN BIOCHEMISTRY:

- i) Introduction,
- ii) Importance of Quality Control.
- iii) Accuracy,
- iv) Precision and Reliability;
- v) Distribution of data, Central tendency
- vi) Standard Deviation.
- vii) Preparation of Q.C. Chart,
- viii) Normal range,
- ix) Coefficient of variation of standards & controls.
- x) Quality Control procedures

**6) CLINICAL INFORMATICS, LABORATORY INFORMATION PROCESSING,
WEB REPORTING.**

SECTION – II BIOCHEMISTRY

BIOCHEMISTRY AND ROUTINE BIOCHEMICAL TESTS:

1) CARBOHYDRATES:-

- i) Introduction
- ii) Classification of carbohydrates
- iii) Regulation of Blood Glucose
- iv) Determination & Clinical Significance of blood glucose and urine glucose
- v) Hyperglycemia and Hypoglycemia
- vi) GTT
- vii) Diabetes

2) PLASMA PROTEIN: -

- i) Introduction
- ii) Function of plasma proteins
- iii) Determination of proteins
- iv) Clinical significance of plasma proteins

3) LIPIDS AND LIPOPROTEINS :-

- i) Introduction of lipids and lipoproteins
- ii) Essential fatty acids
- iii) Determination of Cholesterol
- iv) Triglycerides and lipoproteins
- v) Clinical significance of lipids and lipoproteins

4) ENZYMES:

- a. Introduction to enzymes, as catalysts, nomenclature, classification, properties, factors affecting enzyme activity, isoenzymes and coenzymes.
- b. Clinical Enzymology
 - i) Therapeutic, diagnostic and analytical uses of enzymes
 - ii) Enzyme assays in clinical Biochemistry
 - iii) Conventional methods and Kinetic methods of determination and their clinical significance for,
 - 1. Phosphatases
 - 2. Transaminases
 - 3. Lactate dehydrogenases
 - 4. Creatine Kinase
 - 5. Amylase
 - 6. Gamma glutamyl Transferase

5) HORMONES:

- i) Introduction to Thyroid and parathyroid hormones,
- ii) Adrenal Hormone,

- iii) Pituitary hormones and sex hormones.
- iv) Determination of T₃, T₄, TSH, β-HCG.

6) VITAMINS:

- i) Introduction
- ii) Determination of Vit. B₁₂ & Vit. D₃

7) ELECTROLYTES AND BLOOD GASES:

- i) Introduction of electrolytes,
- ii) Determination of sodium, potassium, serum calcium, urinary calcium, phosphorus, Chloride, iron and their clinical significance.

8) FUNCTION TESTS:

- i) Liver function test
- ii) Renal function tests
- iii) Pancreatic function tests
- iv) Cardiac function tests.

9) MEDICO LEGAL ASPECTS IN LABORATORY FUNCTIONS.

REFERENCE BOOKS:

1. Outlines of Biochemistry. E.Conn, K.Stumpf, G.Bruening & H.Dol, 5/E, John Welley & Sons.
2. Practical Clinical Biochemistry. Horald Varley, 4/E, CBS Publishers.
3. Clinical Chemistry – Interpretation & Techniques, 2nd ed., Kaplan & Lavarnel szabo, Lea & Febiger Publication.
4. Medical Laboratory Technology, 5th reprint 1999, Vol. I, II & III, K.L.Mukharjee, Tata McGraw Hill.
5. Medical Laboratory Technology – Methods & Interpretation, Sood, 4th ed., Jaypee Brothers.
6. Textbook of Medical Laboratory Technology, P.B.Godkar, 1994, Bhalani Publishing House, Mumbai.
7. Hand Book of Medical Laboratory Technology. Chitra Bharucha, H.Meyer R.H.Carman, C.M.College & Hospital, Vellore.
8. Fundamental of Biochemistry A.C.Deb, New Central Book Agency.
9. Clinical Biochemistry. 3rd ed., L.A.Kaplan & A.J.Pesce, The C.V.Mosbey Co.
10. Fundamental of Clinical chemistry. 4th ed., Edited by N.W.Tietz, W.B.Saunders Company.
11. Clinical guide to laboratory Tests. 3rd ed., 1995, Tietz.
12. Tietz Text Book of Clinical Chemistry, 2nd ., 1994, Burtis, W.B.saunders Company.
13. Basic Techniques in Clinical Laboratory Science. 3rd ed., 1992, Linne, Mosbey Publication.

14. Lynch's Medical Laboratory Technology, 4th ed., Raphael, Asian Edition, Saunders Company Publication.
15. Textbook of biochemistry for medical students, 4th edition, D.M.Vasudevan, Shreekumari S. Jaypee brothers medical pub.ltd,Newdelhi.
16. Biochemistry, 3rd edition, U. Satyanarayan, U. Chakrapani, Books & Allied Pvt Ltd Kolkatta.
17. Textbook of medical biochemistry, 5th edition, M.N.Chatterjee, Rana Shinde, Jaypee brothers Medicalpub Ltd,New delhi.

**VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
PROPOSED MODIFIED REVISED PRACTICAL SYLLABUS OF
DIPLOMA IN MEDICAL TECHNOLOGY
(Effective from July-2014)**

PRACTICALS BASED ON PAPER – 1

SECTION – I MICROBIOLOGY

1. Study of Compound Microscope.
2. Cleaning, Neutralization and preparation of glassware for sterilization.
3. Examination of living Bacteria.
 - a) Wet mount preparation
 - b) Hanging – drop technique.
 - c) Semisolid stab agar test.
3. (A) Staining of the bacterial cell:
 - a) The Simple Stain
 - b) The Negative Stain.
- (B) Differential Staining
 - a) The Gram Stain
 - b) The Acid fast Staining.
- (C) Special Staining
 - a) The Spirocheate Stain
 - b) The Metachromatic Granules Stain.
 - c) The spore Stain
 - d) The Capsule Stain
 - e) The Flagella Stain
4. Study of some important biochemical reactions.
 - a)Indole Test.
 - b)Methyl red Test.
 - c)V.P. Test.
 - d)Citrate Utilization Test.
 - e)H₂S Production (2% peptone)
 - f)Study of TSI slants with different
 - g)Fermentation of Sugars
 - h)Test for enzyme activity-Oxidase, Catalase, Coagulase, Urease,

6. Practical Haematology. J. A. Dacie & S. M. Lewis, The English Language Book Society, 8th ed., EIBS
7. Collection and Handling of Laboratory Specimen – A Practical Guide, 1983, Editor T. M. Slockbower & T.A. Bhumenfeld, J. B. Lippincott company, USA

PRACTICAL BASED ON PAPER IV

SECTION – I INSTRUMENTATION

1. Operation of pH meter, Single pan Balance, Spectrophotometer, Colorimeter, Autoanalyzer, Electrophoresis. (Demonstration)

SECTION – II CLINICAL BIOCHEMISTRY

Preferably all the test should be done on semi Auto analyser.

- 1) Blood Glucose/Sugar estimation and GTT.
- 2) Blood Cholesterol – Free & Total HDL Cholesterol, LDL Cholesterol.
- 3) Serum Triglyceride
- 4) Serum Total Protein and Serum Albumin and A/G ratio
- 5) Microalbumin test
- 6) Blood/Urine Urea.
- 7) Blood /Urine Creatinine.
- 8) Blood /urine Uric Acid
- 9) Serum Calcium / Ionized Calcium
- 10) Serum potassium
- 11) Serum Sodium
- 12) Serum Chloride
- 13) Serum Iron, and TIBC (Total Iron Binding Capacity)
- 14) Serum Bilirubin.
- 15) Serum Alkaline Phosphatase.
- 16) Serum Acid Phosphatase.
- 17) S.G.O.T
- 18) S.G.P.T.
- 19) Serum Amylase.
- 20) Serum Lipase
- 21) Serum Protein Electrophoresis and Lipoprotein electrophoresis (Demonstration).
- 22) Cardiac Troponin T (Demonstration)
- 23) Cardiac Troponin I (Demonstration)
- 24) T3 ,T4, TSH ELISA (Demonstration)

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