A Clinical Biochemistry Laboratory

Training Module

for

Technicians

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Preface

This module of biochemistry for lab technicians has several new dimensions of clinical biochemistry it presents the measurement of various constituents of blood and other biological fluids and comprehensive coverage of principle and procedure. Advances in diagnostic methodologies and instrumentation have been impressive but most of these are deleted in the training programme for technicians it has been taken under consideration to include the above which has become essential to interpret the results of the investigations better during their clinical carrier. Emphasis has been given on quality control which is essential to begin for the analysis.

This modules has been designed to incorporate scientific manual procedures although the students will be taught latest techniques by kit procedures with demonstrations.

It is an attempt to omit nothing important. Each chapter begin with a brief introduction, principle, procedure and interpretation of the experiment. I sincerely hope that the training modules will meet the requirements of lab technicians and will benefit then in their carrier.

Dr. Jagarati Jha  MSc (Med.) Biochemistry, Phd.

Clinical Biochemist.
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Pre and post evaluation sheet

Q. 1 What is the use of biochemical tests?
Q. 2 What is precision and accuracy?
Q. 3 What quality control ?
Q. 4 What is the use of automated instruments ?
Q. 5 What are vacutainers ?
Q. 6 What is serum ?
Q. 7 Give the methods for sugar estimation ?
Q. 8 what is the normal range blood glucose level after and overnight fast ?
Q. 9 Why G hb test is done ?
Q.10 What is the normal range of serum urea and the effect of protein diet on it ?
Q. 11 What is the method by which creatinine is estimated give its normal range in serum ?
Q. 12 What does SGOT /SGPT stands for ?
Q. 13 Give the normal range of Alkaline phosphatase ?
Q. 14 What is the normal serum bilirubin level and name the reaction by which bilirubin is estimated colorimetrically ?
Q. 15 Define calorimetry ?
Q. 16 Give the recent method to estimate cholesterol ?
Q. 17. Name the diagnostic enzymes in MI ?
Q. 18 What is the normal serum calcium range ?
Q. 19. Which blood sample is used for analysis in blood gas analyser ?
Q. 20. What are important constituents of CSF used in biochemical examination ?
Q. 21 Name the method of electrolytes estimation ?
Q. 22. What is the normal range of serum electrolytes ?
Q. 23 What is the principle of uric acid estimation ?
Q. 24 Give the normal range of total protein and albumin ?
Q. 25 What the diagnostic enzyme for acute pancreatitis ?
Ans 1. They are used for diagnosis, treatment, prognosis and screening.
Ans 2. Precision is the reproducibility of any analytical method. Accuracy defines how close the measured value is to the actual value.
Ans 3. Quality control is a statistical system for measuring the reproducibility of degree of precision in laboratory procedures. It is an excellent means of improving laboratory efficiency.
Ans 4. They save the labour and time, give reliable quality control, reduce subjective errors and work economically by using smaller quantities of samples and reagents.
Ans 5. Vacutainers are used to collect blood by venipuncture instead of conventional syringes and needles. It consists of 1 sterile syringe 2. Holder 3. Sterile vacutainer tube containing clot activating.
Ans 6. The blood on clotting without any anticoagulant gives a clear supernatant call serum.
Ans 7. 1. Folin-Wu method
   1. Nelson Somogyi method
   2. O-Toluidine method
   3. Glucose oxidase method
Ans 8. blood glucose level in a post absorptive state is 70-110 mg/dl following the ingestion of a carbohydrate mean pp state, the blood glucose may rise to 120-140 mg/dl
Ans 9. It is a diagnostic test formation of Glycated Hb is irressible and the blood level depends on both the life span of RBC (average 120 days) and the blood glucose concentration.
Ans 10. 15-50 mg/dl a high protein diet raises the serum urea level and low protein diet lowers it.
   Range is 1-2 mg/dl
Ans 12. SGOT – Serum glutamate oxaloacetate transaminase.
   SGPT - Serum glutamate pyruvate transaminase.
Ans 13. 20-90 U/L Children upto 350 U/L
Ans 14. 0.2-0.8 mg %, Vandenberg reaction.
Ans 15. This is a technique of measurement that is quantitative analysis of
   substance in all biological fluids. Basis of doing this is to convert the
   substance into coloured product by performing various specific
   reaction. The intensity of colour is directly proportional to the amount
   of substance present in the sample.
Ans 16. Enzymatic method based on the action cholesterol oxidase on
   cholesterol.
Ans 17. SGOT, LDH, CK, CKMB
Ans 18. 9-11 mg %
Ans 19. Arterial blood.
Ans 20. Total protein, glucose and chloride are the most important
   constituents for diagnostic purpose.
Ans 21. 1). Flame photometery 2). Atomic absorption spectroscopy 3). Ion
   selective electrode.
Ans 22. Na+ 135-145 mMol/L, K + 3.5-4.5 mMol/L, Cl- 95-15 mMol/L.
Ans 23. Phosphotungstic acid in alkaline medium oxidizes uric acid to
   allantion and itself gets reduced to tungsten blue which is estimated
   colorimetrically at 700mm.
Ans 24. Total protein is 6-8 g/dl
   Albumin is 3.7-5.3 g/dl
Ans 25. Serum Amylase.