Date- 21-01-21

FIFTH SEMESTER

BIOCHEMISTRY
Semester – V

Clinical Biochemistry

Total Hours: 40

Date- 21-01-21

Unit – I, Clinical enzymology and biomarkers:

- General characteristics, diagnostic & therapeutic use of Lactate dehydrogenase, Creatine kinase, Alkaline phosphatase, Acid phosphatase, Prostate specific antigen, Glucose 6-phosphate dehydrogenase, Amylase and lipase.

Unit – II, Regulation of blood glucose:

- Insulin and diabetes mellitus, factors maintaining blood glucose, normal plasma glucose level, effects of hormones on glucose level, oral glucose tolerance test (OGTT), diagnostic criteria for diabetes mellitus, Impaired glucose tolerance, Insulin, synthesis and secretion of glucagon & insulin.

Unit – III, Organ function test:

- **Liver function test (LFT):** Function of liver, clinical manifestations of liver dysfunction, markers of obstructive liver disease, **Gastric function:** Pancreatic function, mechanism of HCL secretion, Regulation of acid secretion, assesment of gastric function, Interpretations of gastric juice analysis, estimation of free acidity and total acidity, **Pancreatic function:** assesment of pancreatic function, pancreatic function test, **Renal function test**: or kidney function test, glomerular function, tubular function, urea clearance, creatinine clearance test, inulin, proteinurea and **Thyroid function test**.

Unit – IV, Plsama proteins:

- Characteristics & separation technique of Plasma Proteins, functions and clinical significance of albumin, globulin, fibrinogen and Immunoglobulins.

Unit – V, Inborn errors of metabolism:

- Disorders of amino acid metabolism, phenylalanemia, homocystinuria, tyrosinemia, Maple syrup urine disease (MSUD), phenyl ketonuria, alkaptonuria, albinism, amino acidurias, disorder of nucleic acid metabolism, disorders of purine & pyrimidine metabolism.

Practical
Clinical Biochemistry
Semester – V

Total Hours: 40

- Estimation of serum bilirubin by semi auto analyzer.
- Estimation of serum SGPT/ALT by semi auto analyzer.
- Estimation of serum SGOT/AST by semi auto analyzer.
- Estimation of serum alkaline phosphatase (ALP) by semi auto analyzer.
- Estimation of serum cholesterol by semi auto analyzer.
- Estimation of serum HDL by semi auto analyzer.
- Estimation of serum triglyceride by semi auto analyzer.
- Estimation of serum LDL & VLDL by semi auto analyzer.
- Estimation of serum calcium by semi auto analyzer.
- Estimation of serum phosphorus by semi auto analyzer.
- Estimation of serum C.K, CK – MB & Trop – I by semi auto analyzer
- Estimation of serum T_3, T_4 & TSH by ELISA.
- Blood gas analyzer (ABG).

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LABORATORY MANAGEMENT

Semester-V

1- **Introduction to laboratory**

Primary Laboratory, Secondary Laboratory, Tertiary Laboratory, Laboratory Setup, Physical aspects of a Laboratory, Basic Laboratory Safety, Code of Conduct for medical laboratory, Personnel, Accidents in the Laboratory.

2- **Universal Work precaution for lab personnel & Waste Disposal**.

3- **Benefits and costs of management system**.

4- **General requirements**

- Impartiality
- Confidentiality

5. **Structural requirements** (including defining staff roles, reporting Structures and internal communication).

6. **Resource requirements**

- Staff issues (including training and engagement / commitment of staff & managing change).
- Accommodation & environmental conditions (& safety)
- Equipment purchasing & management, calibration and measurement traceability
- Purchasing

1- **Process requirements**

- Client requirements (requests and contracts),and Subcontracting methods
- Sampling and Sample management
- Measurement uncertainty (an introduction)
- Reports (including checking of reports, and rounding of results)
- Complaints & customer feedback
- Handling nonconforming work
- Computer systems/ LIMS
- Quality control charts, Levy- Jennings and Cusum charts.
- Quality control program, intrinsic, extrinsic, random errors and sources of variation in laboratory results.

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MICROBIOLOGY

THEORY: VIROLOGY AND IMMUNOLOGY

Semester – V I

VIROLOGY

1. General morphology, properties and ultra structure of Viruses:- Helical Symmetry, Icosahedral symmetry, Envelop, Glycoprotein, Matrix protein.
2. Classification of viruses
3. Cultivation of viruses - Embryonated eggs, Experimental animals and Cell culture.
4. Bacteriophages; Classification, Morphology, Ultrastructure, Life cycle, Lytic and Lysogenic cycles of Bacteriophages.
5. Morphology, Pathogenesis and Laboratory Diagnosis of DNA viruses, Herpes virus, Hepatitis B Virus , Pox Virus
6. Morphology , Pathogenesis and Laboratory Diagnosis of RNAviruses- Picornaviruses, Rhabdoviruses, HIV,Arboviruses – Dengue Virus , Orthomyxoviridae , Paramyxovirodae, Oncogenic Virus, Coronaviruses.

IMMUNOLOGY-I

1. Immune response; Immunity, Types (Innate and Adaptive immune response).
2. Organs of Immune System; Primary and Secondary lymphoid organ.
3. T and B Lymphocytes, Null Cells.
4. Antigen, Heptanes; Factors effecting immunogenicity, Epitopes (Properties).
5. Antibodies; Structure, Types and function.
6. Complement System; Role of complement system in immune response and components of complement and activation pathways.
7. Hypersensitivity; Definition, Types, Factors causing Hypersensitivity Diseases.

8. Major Histocompatibility Complex (MHC).

Date- 21-01-21

VIROLOGY AND IMMUNOLOGY I

PRACTICAL: Semester – V

VIROLOGY

1. Demonstration of Chick Embryo techniques-Inoculation & Harvesting.

2.) Collection and transport of specimens.

3) Preparation of clinical specimens for Isolation of viruses

IMMUNOLOGY-I PRACTICAL

1. Collection of blood by Venipuncture, Separation of serum, Preservation of serum for short and long periods..
2. Performances of serological tests- Bacterial Slide agglutination tests

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PATHOLOGY
BLOOD BANKING I
Semester - V
Theory

1. **Immunohematology –** Antigen, antibody, complement, senitization, agglutination, Haemolysis.

2. **Blood Groups –**

(i) ABO Blood Group system – Inheritance of ABO blood groups. Antigens of ABO groups, ABO antibodies, ABO subgroups, Bombay blood group, Antisera used in ABO grouping, Blood grouping techniques – Cell grouping, serum grouping, Methods ABO for grouping – slide tube methods. Difficulties in ABO grouping.

(ii) Rh blood group system – Nomenclature, Types of Rh antigens, Rh antibodies, Rh grouping reagents, Tests for Rh grouping.

(c) Other blood group system – Lewis blood group system, MNS blood group system, P blood group system, Kell, Kidd, Duffy and Lutheran blood group systems, Medical application of blood groups.

3. Blood Donor & Collection of blood – Introduction, Blood donor requirements, Criteria for Selection & Rejection, Physical Examination, Screening of donor blood for frequency of donation, Collection of blood, Phlebotomy, Instruction to donor after donation of blood, complications of blood donation (donor reactions)

4. Storage preservation & transport of blood and its components – Blood collection packs, Anticoagulants. Biochemical changes in the stored blood. Preservative solutions, Long term storage of red blood cells, Gas refrigerator lay out of blood bank refrigerator Transportation.

5. Detection and Identification of antibodies – Screening cells. Identification of alloantibodies.

6. Cross matching (compatibility testing) – Introduction, Procedure of cross matching for whole blood transfusion, cross matching in emergencies, procedure for issuing blood unit.

7. Antihuman globulin (coomb's) test – Principle of antiglobulin test, AHG (coomb's) reagent, Gel card techniques for coomb's test , clinical significance of coomb's test, sources of error.

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PATHOLOGY
BLOOD BANKING
Semester -V

PRACTICAL

1. ABO Blood Grouping, RH typing and cross match.
2. Performance of direct and indirect combs test, red cell agglutination test (screening Paul bunnel test).
3. Blood donor selection and screening.
4. Blood collection and preservation, principal of clearing and preparing transfusion bottle and tubing sets – preparation and transfusion reaction and their investigations.
5. **Blood Bank Administration**

   (i) Record Keeping

   (ii) Computerization in blood transfusion service

   (iii) Blood grouping ABO

   (iv) PH typing various techniques