SEMESTER – 6

Medical Technology Syllabus

MT - 17 Medical Microiology -2

Unit 1 Disease of Skin, Wound and Bite

1.1 Scalded skin syndrome, Scarlet fever & Erysipelas
1.2 Mumps, Measles, Rubella
1.3 Gas gangrene
1.4 Surgical and burn wound infections

Unit 2 Diseases of Cardiovascular lymphatic and other system

2.1 Bacteremia and septicemia
2.2 Rheumatic fever
2.3 Leprosy
2.4 Tetanus
2.5 Plague
2.6 Anthrax
2.7 RMSF
2.8 Rabies
2.9 Poliomyelitis
2.10 Meningitis & Encephalitis
2.11 Leptospirosis

Unit 3 Diseases of Urinary and Reproductive System

3.1 Syphilis
3.2 Gonorrhea
3.3 Toxic shock syndrome (TSS)
3.4 Urinary Tract Infections
3.5 Bacterial Vaginitis
3.6 Genital Herpes
3.7 AIDS

Unit 4 Diseases caused by Fungi

4.1 Specimen Collection, handling and Processing.
4.2 Superficial mycoses
4.3 Cutaneous and Subcutaneous mycoses
4.4 Systemic mycoses
4.5 Opportunistic mycoses
4.6 Clinical diagnosis of fungal diseases.

References :

- John Bernard Henry , Clinical Diagnosis and Management by Lab. Methods, , 20th Ed., W.B. Saunders Co.
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- Eleenor M. Travers, Clinical Laboratory Management, Williams & Wilkins.
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- Pelczar, Chan,R., *Microbiology*, 4th ed., Tata McGraw Hill Publishing Co. Ltd.
- Murray, Baron, Pfaller, Tenover, Yolken, Mannual of Clinical Microbiology, 6th ed. ., American Society for Microbiology.
- Konemam E. W, *Color Atlas and Textbook of Diagnostic Microbiology,*5th ed.,Lippincott

MT- 18 Immunology

Unit 1 Immune system and its Components

1.1 Characteristics : Cells, Lymphoid Organs and Lymphoid tissues.
1.2 Non Specific Immune system
. 1.2.1 Physical barriers
1.2.2 Chemical barriers
1.2.3 Cellular barriers
1.2.4 Physiological barriers

1.3 Antigens
- 1.3.1 chemical nature
- 1.3.2 classification of antigens.
- 1.3.4 Haptens and Epitopes

1.4 Antibodies
- 1.4.1 Structure
- 1.4.2 characteristics of immunoglobulins,
- 1.4.3 Types.

Unit 2 Types of immunity

2.1 Antibody mediated immune resposnses.
- 2.1.1 Clonal selection theory
- 2.1.2 Monoclonal Antibody production
- 2.1.3 B cell receptors

2.2 Cell mediated immune responses
- 2.2.1 T cell receptors

2.3 Immunological reactions and their applications.

2.4 Immunization: Types and Vaccine administration schedule in India

Unit 3 Immunological disorder

3.1 Immunodeficiency: Mechanism of immunosupression

3.2 Hypersensitivity - Immediate and delayed type, Anaphylactic reaction

3.3 Autoimmune disorder: Autoimmune haemolytic anemia

Unit 4 Immunotherapy

4.1 IntroductionA major goal for immunotherapy

4.2 Cellular therapeutics-Bone marrow transplantation

4.3 Antibody therapeutics-chimeric ,monoclonal and bispecific antibodies

4.4 Clinical applications of antibodies.

References :

* James T. Barrett, Textbook of Immunology, 5th ed., The C.V. Mosby Company. Irvan M. Roitt, Essential Immunology, 6th ed., ELBS and Blackwell Scientific Publication.
* R.D. Guttmann, 1981, Immunology, A Socpe Publication.
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* Richard M. Hyde, Immunology3rd ed.(NMS), Indian Edition, Williams and Wilkins, Baltimore, Maryland.
* Dasgupta, 1992, Modern Immunology, 2nd ed., Jaypee Brothers Medical Publisher.
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* Nester Anderson ,Roberts, Pearsall ,Nester; Microbiology; International Edition; McGraw Hill Pub.

MT-19 Clinical Parasitology and Histopathology

Unit- 1 Protozoa (Intestinal & urogenital) – morphology, life cycle, laboratory diagnosis

1.1 *Entamoeba histolytica and Entamoeba coli*

I. Giardia lamblia,
II. Trichomonas vaginalis

Unit –2 Protozoa (Blood & Tissue)– morphology, life cycle, laboratory diagnosis

2.1 Plasmodium vivax, P.falciparum, P.malaria, P.ovale

Leishmania donovani, L.tropica, L.brasiliensis

I. Toxoplasma gondii

Unit – 3 Helminthes – morphology, life cycle, laboratory diagnosis

3.1 Nematodes – Intestinal

3.1.1.Ascaris lumbricoides, Ancylostoma duodenale,

i. Necator americanus, Strongyloides stercoralis
ii. Enterobius vermicularis, Trichuris trichiuria
iii. Somatic – Wuchereria bancrofti, Brugia malayi,
iv. Dracunculus medinensis

3.2 Cestodes :-

3.2.1 Taenia saginata, Taenia solium,
3.2.2 Hymenolepis nana,
3.2.3 Diphyllobothrium latum, Echinococcus granulosus

4.1 Fine needle Aspiration cytology – FNAC/FNAB

4.1.1 Indications, collection from various body fluids, Advantages, disadvantages, procedures
4.1.2 Precautions, complications, comparison with Frozen and Tissue biopsy technique
4.1.3 Clinical significance, H&E, May-grunwald, Giemsa and PAP staining technique

4.2 Tissue processing :

4.2.1 Specimen types – biopsy procedures, labelling, collection, grossing and decalcification technique.
4.2.2 Fixatives, fixation, clearing, dehydration, embedding and infiltration, block preparation,
4.2.3 Microtomy – various types

- Microtome knife – types, sharpening an honing.
- Staining – Routine H&E and special stains for various tissue components
- Automated tissue processing and staining techniques.

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* John Bernard Henry, Clinical Diagnosis and Management by Lab. Methods, 20th Ed., W.B. Saunders Co.
* P.B. Godkar, Textbook of Medical Laboratory TechnologyBhalani Publishers, Mumbai, (Latest Edition)
* K.L. Mukherjee, Medical laboratory Technology, Vol.I,II & III, Tata McaGraw Hill, Latest Edition.
* Ramnik Sood, Medical Laboratory Technology, Jaypee Brothers, Latest Edition.
* Chakraborthy & Bhattacharya, A Handbook of Clinical Pathology, Academic Publisher.
* K.D. Chaterjee, Medical Parasitology Chaterjee Medical Publisher, Latest edition.
* L.S. Gracia & D.A. Brukner, Diagnostics Medical Parasitology, ASM Press.
* Y Gutierrcz, Diagnostic Pathology of Parasitic Infections with Clinical Correlation;
* Lea and Febiger publishers, 1990 Ed. London.

MT- 20 Pathophysiology

UNIT : 1 Renal Function Tests & Liver Function Tests

1.1 Anatomy & Functions of Kidney
1.2 Tests of Glomerulus & Tubular functions
1.3 Tests to measure renal Plasma flow
1.4 Other Miscellaneous Test
1.5 Functions of Liver
1.6 Tests based on Abnormalities of Metabolism
1.7 Tests based on Detoxication Function, Excretory Function & Drug Metabolism
1.8 Tests for amino acid catabolism, Serum enzyme activities & Formation of Prothrombin

UNIT : 2 Gastric & Pancreatic & Intestinal function Tests

2.1 Gastric function Test
- 2.1.1 Introduction & Classification
- 2.1.2 Resting Contents Examination
- 2.1.3 Fractional Gastric analysis using test meals
- 2.1.4 Stimulation Tests & Tubeless Gastric Analysis

2.2 Pancreatic Function Test
- 2.2.1 Introduction & Function of Pancreas
- 2.2.2 Tests in Pancreatic Diseases

2.3 Intestinal Function Test

UNIT : 3 Cardiac Function Test & Thyroid Function Test

3.1 Cardiac Diseases: Heat Failure & Myocardial infraction
3.2 Cardiac Enzymes: Creatine Kinase, Lactate Dehydrogenase
3.3 Cardiac markers, Troponin I & T & Myoglobin
3.4 Tests based on Primary Function of thyroid
3.5 Tests for measurement of thyroid Hormones
3.6 Tests based on metabolic effects of thyroid Hormones
3.7 Scanning & Immunological Tests

UNIT : 4 Water, Electrolyte , Acid- Base Balance & Imbalance and Minerals

4.1 Normal Water & Electrolyte balance & Regulatory Mechanism for Water & Electrolyte balance
4.2 Abnormal Water & Electrolyte Metabolism, Pathological variations & Water intoxication
4.3 Acid- Base in normal health & its Regulation
4.4 Acid-Base imbalance
4.5 Detection methods & Significance of : Calcium, Sodium , Potassium , Chloride & Bicarbonate.

References :

* Alex Kaplan, Clinical Chemistry ; Interpretation & Results, Lavernfl Szabo, Lee & Febiger
* S. Ramkrishnan, K.G. Prasannan & S. Rajan, Textbook of Medical Biochemistry, 3e, Orient Longman.
*. K.L.Mukherjee, 1997, Medical Laboratory Technology, Vol.I,II & III, Tata McGraw Hill.
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*. Harold Varley, 1990, Practical Clinical Biochemistry, Indian Edition, Anold Heinemann.
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*. Tietz , Bartis & Ashwood, Textbook of Clinical Chemistry, 3e, W.B. Saunders Co.
*. N.W. Tietz , Fundamental of Clinical Chemistry, 4e, W.B. Saunders Co.
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* Keith Wilson & John Walker, Practical Biochemistry: Principles & Technique, 5ed. Cambridge University Press.
*. U. Satyanarayan, Biochemistry, Books and Allied Pvt. Ltd.

MT – 20 Blood Banking

Unit- 1 Bleeding and Coagulation defects

1.1 Introduction
1.2 Tests to detect abnormalities of Haemostasis
1.3 Tests for Coagulation defects
1.4 Procedures for some commonly used tests for coagulation defects

Unit- 2 Blood Grouping

2.1 ABO and other types of Blood Grouping System, Weaker variants and clinical application
2.2 Rh Blood Grouping system, partial/ Weak D Antigen and clinical application
2.3 Major and Minor cross matching by Saline and Albumin techniques. Direct And Indirect Antiglobulin Tests

Unit- 3 Blood Donation

3.1 Selection of Donor, Tapping of the Donor
3.2 Mandatory screening tests.(HbsAg, HCV, HIV1&HIV2) VDRL & Test for Malaria.
3.3 Tranfusion reactions and their Laboratory investigations

Unit-4 Blood Components

4.1 Red Cell Concentrate (Packed Cells)
4.2 Fresh Frozen Plasma
4.3 Platelet Concentrate

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* C.M. Zmijewski, Immunohaematology, Printece Hall of India.
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* J. A. Dacie & S. M. Lewis , Practical Haematology, The English Language book Society, 8 ed, ELBS.

* Bharucha, Meyerm Moody, Carman, Hand Book of Medical Laboratory Technology, Vellore.
* Technical Manual, American Association of Blood Banks, 1996.
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* Blood Bank Procedure Mannual, Grady Memorial Hospital Lindu Hart, 1976.
*. Technical Methods & Procedures of the Americal Associated Of Blood Bank, 6th ed.

MT - 22 Laboratory instrumentation and techniques

Unit 1 Radio chemical techniques

1.1 Introduction
1.2 Types of radiation and radio active substances
1.3 Measurements of radiation
    1.3.1 GM counter
    1.3.2 Scintillation counter
1.4 Autoradiography
1.5 Biochemcial application of radio isotopes.

Unit 2 Automation

2.1 Introduction
2.2 Automation in Biochemistry laboratory
2.3 Automation in Haematology laboratory
2.4 Automation in Microbiology laboratory
2.5 Automation in Pathology laboratory

Unit 3 Other Laboratory Instrument : Principle, Working, Clinical Applications

3.1 Flame photometer
3.2 Fluorimetry
3.3 Turbidometry and Nephlometry
3.4 Ultracentrifuge
3.5 Blood gas analyser
3.6 X- ray, CT scan and MRI

Unit 4 Emergent Technologies

4.1 Blotting techniques and its clinical applications
4.1 Nucleic acid probes and its clinical applications.

4.2 PCR and its applications in Clinical Laboratory
4.3 Epidemiologic typing methods

SEMESTER – 6

Medical Technology – Practical's

1. Widal test - qualitative and quantitative tube and slide agglutination tests
2. Rheumatoid Arthritis test
3. Pregnancy test by latex haemagglutination technique
4. Diagnosis of syphilis by VDRL and RPR tests
5. ELISA test for HBsAg or antibody (Demonstration)
6 Rapid tests for Leptospirosis, Chikungunia, Dengue (Demonstraion)
7. FNAC Smear staining – (i) PAP smear stain (ii) May Grunvald Giemsa for cytology.
8. Section cutting, fixation & routine tissue processing Staining – Hematoxylen & Eosin Stain
9. Lab. Study of parasites present in (i) Stool (ii) urine (iii) blood
10. Anticoagulants of Blood bank
11. ABO and Rh blood grouping
12. Anti-Human globulin test
13. Anti A / Anti B Saline methods titres
14. Rapid test for detection of HbsAg and HIV antibodies
15. Cross matching
16. Blood components preparation (demonstration)
17. Renal function test
18. Liver function test
19. Cardiac function test (Demonstration)
20. Measurement of T3, T4.TSH (Demonstration)
21. Identification of tumor marker in cancer screening (Demonstation).

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*. Mukherjee K.L., 1999, Medical Laboratory Technology, Vol.I, II & III, Tata McGraw Hill.

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