

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

T. Y. B. Sc.

BIOSCIENCE

(Para- Medical Technology)

EFFECTIVE FROM JUNE 2003

PAPER : VI MEDICAL & APPLIED MICROBIOLOGY

- [A] Medical microbiology
- [B] Parasitology
- [C] Applied microbiology

PAPER : VII HUMAN ANATOMY & PHYSIOLOGY

- [A] Endocrine glands.
- [B] Organs & glands of alimentary tract.
- [C] Some specialized tissues & organs.

PAPER : VIII BIOCHEMISTRY & GENETICS

- [A] Metabolism
- [B] Vitamins & Minerals.
- [C] Nutrition.
- [D] Metabolic disorders.
- [E] Genetics.

PAPER : IX PARAMEDICAL TECHNIQUES

- [A] Immunology.
- [B] Clinical biochemistry.
- [C] Haematology & Blood banking.

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PAPER : VI MEDICAL & APPLIED MICROBIOLOGY

[A] **MEDICAL MICROBIOLOGY:**

Characterization of pathogen, mode of transmission, pathogenesis of symptoms, laboratory diagnosis, treatment, prevention & control measure of Diseases.

- (1) **Disease caused by Bacteria.** : Tuberculosis, Diphtheria, Pneumonia, Enteric- fever, Dysentery, Cholera, Tetanus, Syphilis, Gonorrhoea.
- (2) **Disease caused by Viruses** : Polio, Rabies, Mumps, Hepatitis.
- (3) **Disease caused by Fungi** : Candidiasis, Superficial dermatomycoses.
- (4) **Outline study of some infection:** Sore throat, UTI, Nosocomial infections.

[B] **PARASITOLOGY (Human)**

Morphology and brief life cycle, pathogenesis & symptoms, mode of transmission, Laboratory diagnosis and treatment of,

(1) **Protozoa**

(a) **Intestinal & Genital Protozoa.**

- (1) Amoebae: Entamoeba histolytica.
- (2) Ciliated protozoa: Balantidium coli.
- (3) Flagellated Protozoa: Giardia lamblia.

(b) **Blood Protozoa.**

- (4) Sporozoa: Plasmodium vivax, Plasmodium falciparum.

(2) **Platyhelminthes:**

(a) **Cestoidea.**

- (1) Intestinal Cestodes: Taenia saginata. (Beef tape worm)
Taenia solium. (Pork tape worm)

(3) **Nemathelminthes:**

(a) **Intestinal Nematodes.**

- (1) **Infective for man in egg stage:** Enterobius vermicularis. (Pin worm)
Ascaris Imbricoides. (Round worm)
- (2) **Infective for man in a larval stage:** Ancylostoma duodenale. (Hook worm)
Stongyloides stercoralis. (Thread worm)

(b) **Tissue Nematodes:** Wuchereria bancrofti.

[C] APPLIED MICROBIOLOGY

- (a) Microbiology of Air.
Control of microbes by physical & chemical agents.
- (b) Microbiology of Water & Waste water.
 - Collection of sample, faecal pollution.
 - Microbiological analysis of water.
 - SPC.MPN. DCT. Millipore filter. Faecal streptococci.
 - BOD, Waste water treatment.
 - Physical, Biological & Chemical treatment.
- (c) Microbiology of Milk & Milk products.
 - Biochemical changes by microbes Curdling process & Spoilages.
 - Pasteurization process.
 - Microbiological analysis of milk. Direct coconut, SPC, Reduction tests.
- (d) Microbiology of food.
 - Food poisoning.

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PAPER : VII HUMAN ANATOMY & PHYSIOLOGY

[I] ENDOCRINE GLANDS

Microscopic organization & physiological functions of following Endocrine Glands.

- [1] Pituitary gland.
- [2] Thyroid & Parathyroid gland.
- [3] Adrenal gland.
- [4] Testis & Ovary.

[II] ORGANS & GLANDS OF ALIMENTARY TRACT

Microscopic organization & physiological function of organs & glands related to Alimentary tract.

- [1] Oesophagus.
- [2] Stomach.
- [3] Intestine.
- [4] Salivary gland.
- [5] Liver.
- [6] Pancreas.

[III] SPECIALIZED TISSUES & ORGANS

Microscopic organization & physiological functions of some specialized tissues & Organs.

- [1] Muscles tissue.
- [2] Nervous tissue.
- [3] Skin.
- [4] Kidney.
- [5] Heart (cardium & coronary artery)

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PAPER : VIII BIOCHEMISTRY & GENETICS

[A] METABOLISM

- (1) Metabolism of Carbohydrates.
 - Glycolysis, TCA cycle, Glyconeogenesis.
 - Hexose monophosphate shunt, Glycogenolysis, Glycogenesis.
 - Electron transport chain.
- (2) Metabolism of Protein.
 - Deamination, Transamination.
 - Urea cycle.
 - Protein synthesis.
- (3) Metabolism of lipid.
 - β -oxidation of fatty acids.
- (4) Intermetabolic pathways.

[B] VITAMIN & MINERALS

- [1] Water soluble vitamin: Vitamin B complex, Vitamin C.
- [2] Fat soluble vitamin: Vitamin A,D,E,K,
- [3] Minerals: [Na, K, Cl, Fe, Ca, P.]

[C] NUTRITION

- [1] Balance diet
- [2] Malnutrition.
- [3] Nutrition during pregnancy & lactation.

[D] METABOLIC DISORDERS.

Some metabolic disorders & inborn errors, syndromes related with metabolism of carbohydrate protein & lipid

- | | |
|-----------------------------|------------------------------|
| [1] - Diabetes mellitus. | [2] - Phenylketon urea. |
| - Galactosaemia. | - Alkaptonurea. |
| - Fructose intolerance. | - Hyperammonaemia. |
| - Glycogen storage disease. | [3] - Hyperlipoprotienaemia. |
| | - Gaucher's disease |

[E] GENETICS

- [1] Introduction to mutation & types of mutation, Gene mutation.
- [2] DNA replication.
- [3] DNA repair, restriction, methylation, restriction endonuclease.
- [4] Vectors: Plasmid, Bacteriophage
- [5] Recombinant DNA Technology (Methods & applications)

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PAPER : IX PARAMEDICAL TECHNIQUES

[A] IMMUNOLOGY

- [1] Antigen: Definition, properties, types of antigen.
Antigenic specificity & Vaccines.
- [2] Immunoglobulins: Definition, physico-chemical properties, types.
Ig, G, Ig M, Ig A, Ig D, Ig E,
Outline theory of antibody formation.
- [3] Antigen-antibody reactions & their applications.
- Agglutination, Precipitation, Neutralization, Opsonization.
- Complement fixation.
- [4] Modern techniques in immunology.
- Hybridoma technique & Monoclonal antibodies.
- Radioimmuno assay (RIA)
- Enzyme linked immuno sorbent assay (ELISA)
- [5] Hypersensitivity.
- Immediate type: Anaphylaxis, Cytotoxic, Immune complex
- Delayed type: Tuberculin, Contact dermatitis.
- [6] Introduction to some autoimmune diseases.
- Rheumatic fever, Haemolytic anaemia.

[B] CLINICAL BIOCHEMISTRY

- [1] Biological fluids.
Collection & preservation of biological fluids: Blood, Urine, CSF
Analysis of body fluids: (Physical, Chemical, Microscopic &
Bacteriological examination.) Urine, CSF, Semen, Stool, Sputum.
- [2] Liver & Kidney function test.
- [3] Gastric & Pancreatic function test.
- [4] Enzymes in clinical diagnosis.
- [5] Introduction to cardiac profile tests.

[C] HAEMATOLOGY & BLOOD BANK

- [1] Blood groups & cross-matching, Types of Hb & Hb compound.
- [2] Haematological indices, Haematocrite, ESR.
- [3] Blood coagulation & Haemostasis.
Blood coagulation process, Clotting time.
- [4] Blood transfusion & its complications: Screening of donor, typing,
cross-matching, collection, preservation, Transfusion complication.

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BIOSCIENCE PRACTICALS

PAPER : VI

- [1] Bacteriological analysis of water.
 - (1) Most probable no. – MPN.
 - (2) Differential coliform test – DCT.
 - (3) Standard plate count – SPC.
- [2] Bacteriological analysis of milk.
 - (1) Viable count of milk – SPC.
 - (2) Methylene blue reduction test – MBRT.
 - (3) Isolation of yeast from curd.
 - (4) Isolation of lactobacilli from curd.
- [3] Diagnostic medical problems: (Pure culture study)
 - (1) Salmonella group (2) Shigella group
 - (3) Streptococcus pyogens. (4) Staphylococcus aureus.
 - (5) Pseudomonas aerogenosa. (6) Proteus vulgaris
 - (7) E. coli.
- [4] Antimicrobial sensitivity test.
- [5] Antimicrobial effect of some common household medicine.
(Osimum sanctum, Adhatoda vasica, Azardicta indica.)
- [6] Examination of sputum.
- [7] Examination of stool.
- [8] Study of permanent slide specimens as par theory.

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PAPER : VII

- [1] Dissection of Rat.
 - (1) External characters & Digestive system.
 - (2) Urino-genital system.
 - (3) Nervous system. (Brain)
- [2] Histological technique.
 - (1) Tissue processing. Fixation, Dehydration, Clearing, Impregnation with paraffin & sectioning.
 - (2) Staining. Haematoxylin staining. (Wright iron Haematoxylin)
 - (3) Histological work as exemplified by Kidney, Liver, Spleen, Ovary, Testis, Pancreas.
- [3] Study of permanent slides as par theory.

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PAPER : VIII & IX

[1] **Methods in Clinical Biochemistry.**

Estimation of following blood constitutions:

- (1) Blood sugar by Folin-wu method.
- (2) Blood glucose by GOD-POD method.
- (3) Blood urea & BUN by DAM method.
- (4) Serum total protein & albumin by Biuret & Dumas method.
- (5) Serum total lipid by Phosphovanillin method.
- (6) Serum billirubin by Diazo method.
- (7) Serum cholesterol by Phosphotungastate method.
- (8) Serum uric acid by Phosphotungastate method.
- (9) Serum/Urine creatinine by Alkaline picrate method.
- (10) Serum calcium by O.C.P.C. method.

[2] **Methods in Clinical Enzymology.**

Estimation of blood enzymes:

- (1) Serum amylase by Steet & Close method.
- (2) Serum acid & alkaline phosphatase by King's method.
- (3) SGOT & SGPT by DNPH method.

[3] **Methods in Immunology**

- (1) Latex slide agglutination test for HCG & Rh factor,
- (2) VDRL test, Widal slide test, Widal tube test (Demo.)

[4] **Methods in Haematology & Blood banking.**

- (1) Blood grouping & cross matching,
- (2) Hb estimation, ESR, PCV, & Blood indices.
- (3) Differential WBC count.
- (4) Clotting, Bleeding, Prothombin time.
- (5) Absolute eosinophil count.
- (6) Screening for SCA.
- (7) Preparation of Heinz bodies.
- (8) Separation of lymphocytes from blood.
- (9) Electrophoresis of Serum protein & Hb for SCA
- (10) Coomb's test.

[5] **Examination of Body fluids.**

Physical, chemical & microscopic examination of:

- (1) Urine
- (2) CSF.
- (3) Semen.

[6] **Genetics.**

- (1) Isolation of DNA from bacteria.
- (2) Determination of antibiotic resistance by Plating method.

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LIST OF REFERANCE BOOKS FOR T.Y. B. Sc. BIOSCIENCE

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