

BIO – CHEMISTRY

SEMESTER-V - W.E.F. 2017-18

Theory: BCT-501-Physiology, Clinical Biochemistry and Immunology

60 hrs
(5 periods/
week)

Unit- I : Physiology

12 hours

Digestion and absorption of carbohydrates, lipids and proteins. Composition of blood and coagulation of blood. Hemoglobin and transport of gases in blood (oxygen and CO₂).

Muscle- kinds of muscles and mechanism of muscle contraction.

Unit II: Endocrinology

12 hours

Endocrinology- organization of endocrine system. Classification of hormones. Outlines of chemistry, physiological role and disorders of hormones of thyroid, parathyroid, pituitary and hypothalamus. Introduction of gastrointestinal hormones. Mechanism of hormonal action- signal transduction pathways for glucocorticoids and insulin. Adrenalin, estrogen and progesterone.

Unit- III : Nutritional Biochemistry

12 hours

Balanced diet. Calorific values of foods and their determination by bomb calorimeter. BMR and factors affecting it. Specific dynamic action of foods. Energy requirements and recommended dietary allowance (RDA) for children, adults, pregnant and lactating women. Sources of complete and incomplete proteins. Biological value of proteins. Malnutrition- Kwashiorkor, Marasmus and PEM.

Vitamins- sources, structure, biochemical roles, deficiency disorders of water and fat soluble vitamins. Introduction to nutraceutical and functional foods. Bulk and trace elements-Ca, Mg, Fe, I, Cu, Mo, Zn, Se and F. Obesity and starvation.

Unit- IV : Clinical Biochemistry

12 hours

Plasma proteins in health and disease. Disorders of blood coagulation (haemophilia). Types of anemias, haemoglobinopathies-sickle cell anemia.

Liver diseases-jaundice. Liver function tests- conjugated and total bilirubin in serum, albumin: globulin ratio, Serum enzymes in liver diseases- SGPT, GGT and alkaline phosphatase.

Kidneys-structure of nephron, urine formation, normal and abnormal constituents of urine. Biological buffers. Role of kidneys in maintaining acid-base and electrolyte balance in the body. Renal function test- creatinine.

Unit- V : Immunology

12 hours

Organization of immune system. Organs and cells of immune system. Innate and acquired immunity. Cell mediated and humoral immunity (T- and B- cells). Classification of immunoglobulins, structure of IgG. Epitopes / antigenic determinants. Concept of haptens. Adjuvants. Monoclonal antibodies.

Antigen-antibody reactions- agglutination, immunoprecipitation, immunodiffusion. Blood group antigens. Immunodiagnosics- ELISA. Vaccines and their classification. Traditional vaccines-live and attenuated. Modern vaccines- recombinant and peptide vaccines. Outlines of hypersensitivity reactions.

Practical: BCP-501-Nutritional and Clinical Biochemistry

**45 hrs
(3 periods/week)**

List of Experiments:

1. Estimation of calcium by titrimetry
2. Estimation of iron by Wong's method.
3. Estimation of vitamin C by 2, 6 -dichlorophenol indophenol method.
4. Determination of iodine value of an oil.
5. Estimation of hemoglobin in blood.
6. Total count - RBC and WBC. Differential count.
7. Determination of blood group and Rh typing.
8. Visualization of antigen antibody reactions (Ouchterlony technique).
9. Urine analysis for albumin, sugars and ketone bodies.
10. Estimation of urinary creatinine.
11. Estimation of blood Glucose.
12. Estimation of serum total cholesterol.

THEORY BCT-502: BASIC MICROBIOLOGY

60 hrs
(5 periods/weeks)

Unit –I : History of Development of Microbiology

12hrs

Development of microbiology as a discipline, Spontaneous generation vs. biogenesis. Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming. Role of microorganisms in fermentation, Germ theory of disease, Development of various microbiological techniques. Establishment of fields of medical microbiology and immunology through the work of Paul Ehrlich, Elie Metchnikoff, Edward Jenner

Unit-II: Diversity of Microbial world

12hrs

Binomial Nomenclature, Whittaker's five kingdom and Carl Woese's three kingdom classification systems and their utility. Difference between prokaryotic and eukaryotic microorganisms. General characteristics of different groups: acellular microorganisms (Viruses, Viroids, Prions) and Cellular microorganisms (Bacteria, Algae, Fungi and Protozoa) with emphasis on distribution and occurrence and mode of reproduction.

Unit-III : Viruses, Bacteria and Protozoa

12hrs

An introduction to viruses with special reference to the structure and replication of the following: Poxvirus and Poliovirus. Bacterial Diseases- Cholera and Typhoid. TMV and T₄ . Protozoan Diseases- Amebiasis and Malaria.

Unit- IV: Algae

12hrs

History of phycology; General characteristics of algae: occurrence, thallus organization, algae cell ultra structure, pigments, flagella, eyespot food reserves and vegetative, asexual and sexual reproduction. Applications of Algae in agriculture, industry, environment and food.

Unit- V: Fungi

12hrs

General characteristics of fungi - habitat, distribution, nutritional requirements, fungal cell ultra-structure, thallus organization and aggregation, fungal wall structure and synthesis, asexual reproduction, sexual reproduction, heterokaryosis, heterothallism and parasexual mechanism. Economic Importance of Fungi in Agriculture, environment, Industry, medicine, food, biodeterioration, mycotoxins

PRACTICAL BCP-502: BASIC MICROBIOLOGY

**45 hrs
(3 per/week)**

List of Experiments:

1. Microbiology Laboratory Practices and Biosafety.
2. To study the principle and applications of important instruments (biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter)
3. Preparation and sterilization of culture media for bacterial cultivation
4. Study of different shapes of bacteria, fungi, algae, protozoa using permanent slides/ pictographs
5. Staining of bacteria using Gram stain
6. Isolation of pure cultures of bacteria by streaking method.
7. Estimation of CFU count.

SUGGESTED READINGS

1. Atlas RM. (1997). Principles of Microbiology. 2nd edition. W M.T.Brown Publishers.
2. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company

S.V.UNIVERSITY DEGREE EXAMINATION – 2017

B.Sc., (Biochemistry) Fifth Semester

BCT-501: Physiology, Clinical Biochemistry and Immunology

Time: Three hours

maximum: 75 marks

SECTION - A


Answer any **FIVE** of the following ($5 \times 3 = 15$ Marks)

- 1) Composition of blood
- 2) Hypothalamus
- 3) BMR
- 4) Sickle cell anemia
- 5) Innate immunity
- 6) Functional foods
- 7) Adrenalin
- 8) Haptens

SECTION -B

Answer **ALL** the questions ($5 \times 12 = 60$ Marks)

9. (a) Explain in detail about hemoglobin and transport of gases in blood (oxygen and CO_2).
Or
(b) Write about different kinds of muscles. Describe the mechanism of muscle contraction
10. (a) Discuss about chemistry, physiological role and disorders of the thyroid hormones.
Or
(b) Explain about signal transduction pathway for glucocorticoids.
11. (a) Write in detail about energy requirement and RDA for children and adults.
Or
(b) Write in detail about source, structure, role and deficiency disorders of fat soluble vitamins.
12. (a) What about liver disease jaundice. Describe in detail about various liver function tests.
Or
(b) Give an account on structure of nephron. Explain the mechanism of urine formation.
13. (a) Discuss about Humoral type of immunity.
Or
(b) Explain about ELISA- Enzyme Linked Immunosorbent Assay.


Prof. O.Vijaya Sarathi Reddy
Department of Biochemistry
Sri Venkateswara University
TIRUPATI-517 502, (A.P.), India.

S.V.UNIVERSITY DEGREE EXAMINATION – 2017

B.Sc., (Biochemistry) Fifth Semester

BCT-502: Basic Microbiology

Time: Three hours

maximum: 75 marks

SECTION - A


Answer any **FIVE** of the following ($5 \times 3 = 15$ Marks)

- 1) Robert Koch
- 2) Germ theory
- 3) Binomial nomenclature
- 4) Prions
- 5) Polio virus
- 6) Typhoid
- 7) Eyespot food reserves
- 8) Mycotoxins

SECTION -B

Answer **ALL** the questions ($5 \times 12 = 60$ Marks)

9. (a) Elaborate on the contributions of Louis Pasteur.
Or
(b). Discuss about the contribution of Edward Jenner to the field of medical microbiology and immunology.
10. (a) Write the difference between prokaryotic and eukaryotic microorganisms.
Or
(b) Give a detailed account on distribution, occurrence and mode of reproduction in bacteria.
11. (a) Discuss in detail about the structure and replication of the polio virus.
Or
(b) Explain in detail about the protozoan disease of malaria.
12. (a) Describe in detail about the occurrence, thallus organization and ultra structure of algae.
Or
(b) Give an account on application of algae in agriculture, industry, environment and food.
13. (a) Discuss about the general characteristics of fungi and a note on cell wall structure.
Or
(b) Explain about the asexual and sexual reproduction mechanism of the fungi.


Prof. O.Vijaya Sarathi Reddy
Department of Biochemistry
Sri Venkateswara University
TIRUPATI-517 502, (A.P.), India