

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN MICROBIOLOGY
FIRST YEAR - SECOND SEMESTER
(Revised Syllabus under CBCS w.e.f. 2020-21)

MBT – II: MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

TOTAL HOURS: 48

CREDITS: 4

UNIT-I:

No. of hours: 12

Concept of bio-molecules - Building blocks of life, Macromolecules. **Concept of Bioenergetics** - First and second laws of Thermodynamics. Definitions of Gibb's Free Energy, enthalpy and Entropy and mathematical relationship among them. **Carbohydrates** – Classification, chemistry, properties, and function– mono, di, oligo and polysaccharides. **Lipids** – classification, chemistry, properties and function – free fatty acids, triglycerides, phospholipids, glycolipids & waxes

UNIT-II:

No. of hours: 9

Amino acids – classification, structure and function. Essential amino Acids & amphoteric nature of amino acids and reactions and functions of carboxyl and amino groups and side chains. **Proteins** – isolation and characterization of proteins. Structural levels of proteins– primary, secondary, tertiary and quaternary, denaturation of proteins. Hydrolysis of proteins. Outlines of Protein sequencing using various methods.

UNIT – III:

No. of hours: 9

Nucleic acids – structure, function and their properties. Structural polymorphism of DNA, RNA. Chemical structure and base composition of nucleic acids, Chargaff's rules, Watson Crick Model (B-DNA), deviations from Watson-Crick model, other forms of DNA (A- and Z-DNA), forces stabilizing nucleic acid structures, (hydrogen bonds and hydrophobic associations, base stacking). Structural characteristics of RNA. Types of RNA.

UNIT – IV:

No. of hours: 9

Aerobic respiration - Glycolysis, HMP path way, ED path way, TCA cycle, Electron transport, oxidative and substrate level phosphorylation. Kreb's cycle, glyoxylate cycle, hexose monophosphate (HMP) shunt, gluconeogenesis. Anaerobic respiration Fermentation, Biochemical mechanisms of lactic acid, ethanol, butanol and citric acid fermentations. Nitrate and sulphate respiration. Outlines of oxygenic and anoxygenic photosynthesis in bacteria.

UNIT- V:

No. of hours: 9

Properties and classification of Enzymes. Biocatalysis- induced fit and lock and key models. Coenzymes and Cofactors. Factors affecting catalytic activity. Inhibition of enzyme activity- competitive, noncompetitive, uncompetitive and allosteric. Enzyme kinetics: Michaelis-Menten equation, effect of substrate concentration, effect of enzyme concentration, effect of pH and temperature, temperature.

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MBP – II: MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

TOTAL HOURS: 30

CREDITS: 2

1. Qualitative Analysis of Carbohydrates.
2. Qualitative Analysis of Aminoacids.
3. Colorimetric estimation DNA by diphenylamine method.
4. Estimation of RNA by Orcinol method.
5. Colorimetric estimation of proteins by Biuret / Lowry method.
6. Estimation of reducing sugar-Anthrone method.
7. Estimation of sugar by titration method–Benedict’s method.
8. Determination of pKa and pI values of amino acids.
9. Assay of amylase activity
10. Effect of temperature / pH on enzyme activity
11. Demonstration of alcoholic fermentation.

SUGGESTED READING:

- Tortora, G.J., Funke, B.R and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004)
- Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H.Freeman and Company Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.
- Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2 nd Edition, CBS Publishers and Distributors, New Delhi.
- Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.
- Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H.Freeman
- Voet,D. and Voet J.G (2004) Biochemistry 3rd edition, John Wiley and Sons
- White, D. (1995). The Physiology and Biochemistry of Prokaryotes, Oxford University Press, New York.
- David T. Plummer. An Introduction to Practical Biochemistry



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SRI VENKATESWARA UNIVERSITY
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FIRST YEAR - SECOND SEMESTER
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MBT – II: MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks

PART – A

Answer any Five of the following question.

(5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

PART – B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)