

**PITHAPUR RAJAH'S GOVERNMENT COLLEGE
(AUTONOMOUS)
KAKINADA**

(Affiliated to Adikavi Nannaya University)



BOARD OF STUDIES

**DEPARTMENT OF
BIOCHEMISTRY
(2021-22)**

(CHOICE BASED CREDIT SYSTEM)

P.R. GOVT. COLLEGE (AUTONOMOUS) KAKINADA.
2021-22, BOARD OF STUDIES MEETING .
DEPARTMENT OF BIOCHEMISTRY

The members present have discussed the syllabus and model question papers (Theory and Practical) related to I to VI semesters in Biochemistry and made the following Resolutions.

Resolution I: Resolved to continue CBCS System as instructed by Commissioner of Collegiate Education) CCE, Vijayawada.

Resolution II: Resolved to implement 50% external and 50% internal marks for admitted batch 2021 and 60% external and 40% internal marks for admitted batch prior to 2021 both theory and practical's from the academic year 2021 - 22

Resolution III: Resolved to reduce 40 marks of Theory internal to 20 marks for mid exams and 20 marks for co-curricular activities (Seminar / Assignment / Quiz / Group Discussion) and reduce 50 marks of theory internal to 25 marks for mid exams and 25 marks for co-curricular activities (Seminar / Assignment / Quiz / Group Discussion).

Resolution IV: Resolved to conduct Practical Examination also at the end of each semester even for I year II year students.

Resolution V: Resolved to follow the same syllabus and exam pattern for the coming II- and III-year students.

Resolution VI : Resolved to follow the same syllabus for I year in to be prescribed by APSCHE in the near future.

Resolution VII: Resolved to encourage the students to enroll MOOCS Online courses.

Resolution VIII: Resolved to continue two subject electives (Advanced electives) in the V semester Immunology and clinical biochemistry

Resolution IX: Resolved to continue cluster papers (1-Clinicalbiochemistry, 2-Haematology, 3-Medical Microbiology along with project for final year students at the end of VI semester)

Resolution X: Resolved to introduce an cluster paper in VI semester with Paper-I-Organization of cell structure Paper-2 Genetic & Ecology and Paper III-Applied Biochemistry

Resolution XI: Resolved to continue the same paper setters and examiners for all the semesters.

Resolution XII: Resolved to include Blue Prints for model question papers for all semesters.

Chairperson
Board of Studies
Dept. of Biochemistry

P.R. GOVERNMENT COLLEGE (AUTONOMOUS) KAKINADA
DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDIES MEETING 2021-22

Time: 2.00 PM
 Mode of Conduct of meeting: Offline mode (Online mode through Google meet) Date: 02-12-2021

The BOARD OF STUDIES Meeting of the Department of Food Science took place at 11.00 A.M. on 02-12-2021 in Offline mode (Online mode through Video conference in Google meet) in the Department of Food Science

P.R. Govt. College(A) Kakinada for the year 2021-22.

The following members attended in the (Videoconference) BoS meeting.

Sl No	Name and affiliation	Designation	Signature
01	Smt.M. Suvarchala Lecturer in Home Science, A.S.D. Govt. Degree College (W), Kakinada	University Nominee	M. Suvarchala 2/12/21
02	V. Anantha Lakshmi Lecturer in Chemistry G.D.C Pithapuram	Subject Expert	V. Anantha Lakshmi 2/12/21
03	Sri V. Mallikarjuna Sarma Lecturer in Chemistry A.S.D Women's degree college, Kakinada.	Subject Expert	S. V. Mallikarjuna Sarma
04	Dr.D.RamaRao Lecture in charge Department of Chemistry P.R.Govt. College, Kakinada	Member	Dr. D. Rama Rao
05	T.V.V.Satya Narayana Lecture in charge Department of Biochemistry P.R.Govt. College, Kakinada	Member	T.V.V. Satya Narayana 2/12/21
06	B. Vineela Devi Guest Faculty in biochemistry P.R.Govt College, Kakinada	Member	B. Vineela Devi 2/12/21
07	Y. Laxmi Sai Ramya Guest Faculty in Food Science P.R.Govt College, Kakinada	Member	Y. Laxmi Sai Ramya 2/12/21
08	M.B.S.S.Guru Dev B.Sc(FBC)Third year Regd.No. 2201504	Student member	M.B.S.S. Gounder
09	K. Prem Sekhar B.Sc(FBC)Third Year Regd.No. 2201503	Student member	K. Prem Sekhar

**P.R.GOV.T. COLLEGE(AUTONOMOUS)KAKINADA
DEPARTEMENT OF BIOCHEMISTRY AND FOOD SCIENCE
BOARD OF STUDIES MEETING IN BIOCHEMISTRY
2021-2022
LIST OF EXAMINERS**

S.No	Name of the Examiner	Subject	Name of the College
1	D.Kalyani	Assistant professor in Biosciences	Adikavi Nannaya University RAJAHMAHENDRAVARM.
2	Dr.P.Jyothi Kumari	Lecturer in Biosciences	St.Theresa Degree College, Eluru.
3	Dr.Srirangam	Lecturer in Food Technology	Layola College Vijayawada.
4	G.V.Sowmya	Lecturer in Biosciences	Dr.V.S.Krishna Degree College, Visakhapatnam.
5	Dr. Sandeep	Assistant Professor in Biosciences	Gitam University, Visakhapatnam.

ACTION PLAN BOS MEETING -BIO CHEMISTRY HELD ON 02-12-2021.

Department activities for the academic year 2021-2022.

Organizing National/ State level seminars/Workshops/ Conferences/ Training Programmes etc., with topics and other details.

(Mandatory for each Department)

- i) National Science Day - Last week of February
- ii) Guest Lectures
- iii) Biochemists' Day- Third week of March
- iv) World Blood Donor Day- Second week of June
- v) DNA Day- Third week of April
- vi) World Health Day- First week of April

P.R. GOVERNMENT COLLEGE (A), KAKINADA
Department of Biochemistry and Food Science

Objectives of Department of Biochemistry

- To acquaint students with various fields of Biochemistry and their applications.
- To acquaint students with concept of Cell Biology and Cytogenetics.
- To acquaint students with basic techniques in Staining and Sterilization.
- To understand the structure and biological functions of Carbohydrates, Amino Acids, Lipids and Nucleotides.
- To familiarize students with the various cells and organs of the immune system, Immune Effector Mechanisms and various Immuno techniques.
- To acquaint students with DNA Replication, Repair, gene expression and regulation.
- To gain awareness about different Types of Environmental Pollution and Related Issues

B. Sc Biochemistry, Food Science and Chemistry Course
PROGRAMME OUTCOMES

For every degree program expectations are listed out by the institution under the Program Outcomes. For B. Sc Biochemistry, Food Science and Chemistry Stream the following are set as Program Outcomes.

P01 Knowledge and understanding of:

- Students will be able design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields.
- Describe how scientific methodologies are used to conduct experiments and develop products
- The students understood the concept of cell and their activities.

P02. Intellectual skills-be able to:

- Think logically and organize tasks into a structured form.
- Assimilate knowledge and ideas based on wide reading and through the internet.
- Transfer of appropriate knowledge and methods from one topic to another within the subject.
- Understand the evolving state of knowledge in a rapidly developing field.
- Construct and test hypothesis.
- Plan, conduct and write an important independent term project.

PO3. Practical skills:

- Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general biotechnology security precautions.
- Students will evaluate the accuracy of different types of measuring devices to accurately measure a solution. They will statistically analyze their data to determine the best measuring device to use data
- Characterize isolated DNA and RNA using agarose gel electrophoresis and analyze agarose gel
- Perform basic microbiological techniques such as sterile plating and isolation of single colonies, culturing bacteria in liquid broth.
- PCR amplify target genomic DNA and ligate into vector and transform bacteria with r DNA.

PO4. Transferable skills:

- Use of IT (word-processing, use of internet, statistical packages and databases).
- Communication of scientific ideas in writing and orally.
- Ability to work as part of a team.
- Ability to use library resources/Equipment.
- Time management.

PO5. Problem analysis

- Identify the taxonomic position of animals
- Design solutions from medicinal animals for health problems, disorders and disease of human beings / animals which meet the specified needs
- Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data,

PO6. Environment and sustainability:

- Understanding of the causes, types and control methods for Environmental Pollution.
- Application of different life forms in Environmental Remediation.

PO7. Ethics:

- Apply ethical principles and commit to environmental ethics and responsibilities and norms the environment

PO8. Individual and team work:

- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- Elicit views of others, mediate disagreements and help reach conclusions in group settings

PO9. Communication:

- Communicate effectively on complex group activities and with society at large. Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language
Manage projects and in multidisciplinary environments.

PO10. Critical Thinking:

- Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO11. Effective Citizenship:

- Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO12. Life-long learning:

- Recognize the need for, and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.

Course outcomes**I Semester - Biomolecules**

The objective of this paper is to learn biological concepts, carbohydrates & their classification, Amino acids & their classification proteins & their classification and to learn about the structures and functions of carbohydrates, amino acids and proteins.

II Semester- Nucleic Acids and Biochemical Techniques

1. The objective of this paper is to learn nature of nucleotides, their physical and chemical properties and about porphyrins and their properties.
2. This course deals with the Biochemical techniques of chromatography, electrophoresis & Spectrophotometry of their principles and applications.

III Semester - Enzymology and Bioenergetics

- 1) This curriculum gives an opportunity to learn about Enzymes.
- 2) This also imparts knowledge about biological oxidation & their enzymes, mitochondrial electron transport chain, oxidative phosphorylation and about photo phosphorylation

Semester IV - Intermediary metabolism

1. This course aims at the biological energy transformations
2. This also imparts knowledge about metabolism of carbohydrates fatty acids Amino acids, nucleic acids and Inborn errors.

Semester V- Physiology, Clinical Biochemistry and immunology

1. This gives an insight into the digestion, absorption of carbohydrates, protein and lipid. Transport of gases and endocrine system.
2. This is to provide knowledge to the students to learn about human nutrition concepts and disorders associated and vitamins and minerals.
3. To provide basic knowledge about organization of immune system and antibodies function and activity.

Semester V- Molecular biology and Recombinant DNA technology

1. This is to provide knowledge about protein synthesis & their events, regulation of gene expression
2. This is to provide knowledge to the students to learn about recombinant DNA technology
3. This also imparts knowledge about molecular biology blotting techniques and bioinformatics

Semester VI - Basic Microbiology

1. This is to provide knowledge about development of microorganisms, development of microorganism
2. This also imparts knowledge about viruses, bacteria, protozoa, algae and fungi.

Semester VI- Biochemical correlation and disorders

1. This is to provide knowledge about disorders of endocrine glands-pituitary & thyroid gland.
2. This also imparts knowledge about protein malnutrition, disorders of vitamins & digestive system.

P.R.GOV.T. COLLEGE (AUTONOMOUS) KAKINADA
DEPARTMENT OF BIOCHEMISTRY
BOARD OF STUDY MEETING 2021-22
CHOICE BASED CREDIT SYSTEM
FOR ADMITTED BATCH 2021-2022
I YEAR FBC

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
I	I	I	Biomolecules	4	2	50	50	100
			Practical – I	2	1	-	50	50
	II	II	Nucleic acids and Biochemical Techniques	4	2	50	50	100
			Practical – II	2	1	-	50	50

P.R.GOV.T. COLLEGE (AUTONOMOUS) KAKINADA

DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDY MEETING 2021-22

CHOICE BASED CREDIT SYSTEM

ADMITTED BATCH 2020-2021

II YEAR FBC

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
II	III	III	Enzymology and bioenergetics	4	4	40	60	100
			Practical – III	2	1	15	35	50
	IV	IV	Intermediate metabolism	4	4	40	60	100
			Practical – IV	2	1	15	35	50
		V	Physiology, clinical Biochemistry and Immunology	4	4	40	60	100
			Practical – V	2	1	15	35	50

P.R.GOV.T. COLLEGE (AUTONOMOUS) KAKINADA
DEPARTMENT OF BIOCHEMISTRY
BOARD OF STUDY MEETING 2021-22
CHOICE BASED CREDIT SYSTEM
ADMITTED BATCH 2019-2022
III YEAR FBC SEMESTER -V

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
III	V	V	Physiology, clinical Biochemistry and Immunology	3	4	40	60	100
			Practical – V	2	2	15	35	50
		VI	Molecular biology and Recombinant DNA Technology	3	4	40	60	100
			Practical – VI	2	2	15	35	50

P.R.GOV.T. COLLEGE (AUTONOMOUS) KAKINADA
DEPARTMENT OF BIOCHEMISTRY
BOARD OF STUDY MEETING 2021-22
CHOICE BASED CREDIT SYSTEM
ADMITTED BATCH 2019-2022
III YEAR FBC SEMESTER -VI

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
III	VI	Any One paper from VI A or VI B	Basic Microbiology	3	4	40	60	100
			Practical – VI A	2	2	15	35	50
			Biochemical correlation and disorders	3	4	40	60	100
			Practical – VI B	2	2	15	35	50
		CLUSTER VII A	I. Clinical Biochemistry	3	4	40	60	100
			Practical – VII-I	2	2	15	35	50
			II. Hematology	3	4	40	60	100
			Practical – VII-II	2	2	15	35	50
		CLUSTER VII B	III. Medical Microbiology	3	4	40	60	100
			PROJECT	2	2	-	50	50
			I. Organization of Cell structure	3	4	40	60	100
			Practical – VII-I	2	2	15	35	50
			II. Genetics and Ecology	3	4	40	60	100
			Practical – VII-II	2	2	15	35	50
			III. Applied Biochemistry	3	4	40	60	100
			PROJECT	2	2	-	50	50

GUIDELINES FOR ALLOTMENT OF EXTRA CREDITS

S.No.	Activity	Details of achievement	Credits
1	MCC Course	SWAYAM NPTEL CEC etc. (Course Completion certificate with credits should be produced for the claim of extra credits)	Total credits achieved will be considered
2	NCC	B CERTIFICATE	2
		Participation in National Camp after 'B' certificate	3
		C certificate	4
		Adventure camp RD parade along with 'B'	5
		Failed in B certificate Examination	1
3	Sports	Intercollegiate selection	2
		South zone selection	3
		All India participation	4
		Winning medals in all India competitions	5
4	NSS	40% attendance in regular NSS activities	1
		50% attendance with Community Service	2
		Conduct of survey Youth exchange/RD	3
5	JKC	Enrollment and training	1
		Campus recruitment local level	2
		MNC's reputed companies	3
6	Community service	Participation in community service by departments (outreach Programmes)	2
7	Cultural activity	Winning medals at state level-2, District level-1	2 1
8	COP/Addon Course	Pass in Certificate Exam-1, Diploma-2	1 2
9	Support services	Lead India, Health club, RC and Eco Club etc., participation in various Programmes	1

Details of Online courses proposed for the year 2021 – 22

S.No	Name of Online Course	Conducted by	No. of credits
1	Basic concepts of Enzymology	UGC	4
2	Human Genetics	UGC	4
3	Basics of Human Genetics	UGC	2
4	Human Nutrition and Biochemistry	UGC	4

P.R. GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
BIOCHEMISTRY SYLLABUS
SEMESTER - I PAPER-I BIOMOLECULES-I
ADMITTED BATCH 2021-2022
(COURSECODE-BC1212)

Hrs:60

CREDITS-2

INSTRUCTIONAL OBJECTIVES

The objective of this paper is to learn Biological concepts, carbohydrates & their classification, Amino acids & their classification proteins & Their classification and to learn about the structures and functions of carbohydrates, amino acids and proteins.

Unit-I: Biophysical Concepts
hours

12

Water as a biological solvent and its role in biological processes. Biological relevance of pH, measurement of pH, PKa of functional groups in biopolymers such as proteins and nucleic acids. Importance of buffers in biological systems, ion selective electrodes, and oxygen electrode. Donnan membrane equilibrium. Significance of osmotic pressure in biological systems.

Unit-II: Carbohydrates
hours

12

Carbohydrates: Classification, monosaccharide, D and L designation, open chain and cyclic structures, epimers and anomers, mutarotation, reactions of carbohydrates (due to functional groups - hydroxyl, aldehyde and ketone). Amino sugars, Glycosides. Structure and biological importance of disaccharides (sucrose, lactose, maltose, isomaltose, trehalose), trisaccharides (raffinose, melezitose), structural polysaccharides (cellulose, chitin, pectin) and storage polysaccharides (starch, inulin, glycogen).

Unit-III: Lipids
24 hours

Lipids: Classification, saturated and unsaturated fatty acids, structure and properties of fats and oils (acid, saponification and iodine values, rancidity). General properties and structures of phospholipids, sphingolipids and cholesterol and lipoproteins, Bio membranes: Behavior of amphipathic lipids in water-formation of micelles, bilayers, vesicles, liposomes. Membrane composition and organization- Fluid mosaic model.

Unit-VI: Amino acids, Peptides and Proteins
12 hours

Amino Acids: Classification, structure, stereochemistry, chemical reactions of amino acids due to carbonyl and amino groups. Titration curve of glycine and pKa values. Essential and non-essential amino acids, non-protein amino acids. Peptide bond-nature and conformation. Naturally occurring peptides- glutathione, enkephalin

Proteins: Classification based on solubility, shape and function. General properties of proteins, denaturation and renaturation of proteins. Structural organization of proteins- primary, secondary, tertiary and quaternary structures (Eg. Hemoglobin, Myoglobin)

P.R. GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
BIOMOLECULES-I PAPER-I
ADMITTED BATCH 2021-2022
MODEL QUESTION PAPER

Time: 2.30 hrs.

Marks: 50M

PART-I

Note: Answer any **THREE** questions choosing atleast one question from each Section

3 x 10 = 30M

SECTION-A

1. Explain the significance of osmotic pressure in biological system.
2. Describe the structure and biological importance of storage polysaccharides.
3. Describe the structure and properties of phospholipids.

SECTION-B

4. Describe various chemical reactions of amino acids
5. Describe the molecular structure of fluid mosaic model of plasma membrane.
6. Write the classification of proteins based on solubility.

PART-II

Answer any **Four** questions (Short answer questions)

4x5=20Marks

7. Donnan membrane equilibrium.
8. Water as biological solvent.
9. Structure and biological importance of Sucrose
10. Mutarotation.
11. Essential and nonessential amino acid.
12. Peptide-Glutathione
13. Denaturation of protein

P. R. GOVERNMENT COLLEGE(A), KAKINADA
CHOICE BASED CREDIT SYSTEM
SEMESTER-I PAPER-I BIOMOLECULES-I
ADMITTED BATCH 2021-2022
BLUEPRINT FOR QUESTION PAPER SETTER

Time:2.30 hours

Max marks:50

MODULE NO.	ESSAY QUESTIONS 10 MARKS	SHORT ANSWER QUESTIONS 5 MARKS	MARKS ALLOTTED TO THE UNIT
UNIT- I	01	02	20
UNIT- II	01	02	20
UNIT- III	01	02	20
UNIT- IV	03	01	35
Total no. of Questions	06	07	95

NOTE: The question paper setters are requested to kindly adhere to the format given in the above table

P.R.GOVERNMENT COLLEGE (A), KAKINADA.
CHOICE BASED CREDIT SYSTEM
SEMESTER-I PAPER-I BIOMOLECULES-I
ADMITTED BATCH 2021-2022
QUESTION BANK

EASY QUESTIONS (10 Marks)

Unit-I

1. Explain the significance of Osmotic pressure in biology.
2. Explain the Water as biological solvents and its role in biological Process
3. Explain the importance of buffers in biological system.

Unit-II

4. Write the classification of Carbohydrates.
5. Describe the structure and biological importance of storage Polysaccharides.
6. Describe the structure and biological importance of Structural polysaccharides.
7. Explain the various chemical reactions of Carbohydrates.

Unit-III

8. Write about the Classification of Lipids.
9. Describe the molecular structure of fluid mosaic model of Plasma membrane.
10. Explain the general properties and structures of phospholipids.

Unit-IV

11. Write about the Classification of Amino acids.
12. Explain the chemical reactions of Amino acids.(due to carbonyl and amino group)
13. Describe the structural organization of Proteins.
- 14.Explain the classification of proteins. (Based on solubility, shape and functions

SHORT ANSWER QUESTIONS (5 Marks)

Unit-I

1. Donnan membrane equilibrium.
2. Biological relevance of pH
3. Oxygen electrode.
4. Measurements of pH, pKa

Unit-II

5. Structure and Biological importance of Sucrose.
6. Structure and Biological importance of maltose.
7. Structure and Biological importance of lactose.
8. Structure and Biological importance of trehalose
9. Amino sugars.
10. Glycosides.

Unit-III

11. Structure and properties of fats.
12. Lipoproteins.
13. Sphingolipids.
14. Cholesterol

Unit-IV

15. Titration curve of Glycine.
16. Essential amino acids and Non-essential amino acids
17. Naturally occurring peptides
18. Denaturation
19. Hemoglobin

**P.R.GOVERNMENT COLLEGE (A), KAKINADA,
CHOICE BASED CREDIT SYSTEM
SEMESTER-I PAPER-I BIOMOLECULES-I
ADMITTED BATCH 2021-2022**

CREDITS-1

Hrs :2

List of Experiments:

- 1.Preparation of buffers(acidic, neutral and alkaline)and determination of pH.
- 2.Titration curve of glycine and determination of pK_a and pI values.
- 3.Qualitative identification of carbohydrates- glucose, fructose, ribose, maltose, sucrose ,lactose, starch/ glycogen.
- 4.Preparation of Osazones and their identification.
- 5.Qualitative identification of amino acids – Alanine, histidine, tyrosine, cysteine, glutamic acid.
- 6.Qualitative identification of lipids- solubility, saponification, acrolein test, Salkowski test, Acid number and Iodine number tests.

Recommended Books for UG Course -Biochemistry

General Biochemistry

1. Leininger's Principles of Biochemistry–Nelson .D.L. and Cox.M.M.,Freeman & Co.
2. Biochemistry– Berg.J.M.,Tymoczko.J.L. and Stryer.L.,Freeman&Co.
3. Biochemistry– Voet.D and Voet., J.G.,John Wiley& Sons.
4. TextbookofBiochemistry–West.E.S.,Todd.W.R,Mason.H.S..and.Bruggen, J.T.V.,Oxford

&IBH Publishers.

5. Fundamentals of Biochemistry–Jain, J.L., Jain,S.,Jain,N. S.Chand &Co.
6. Biochemistry–Satyanarayana.U and Chakrapani.U, Books& AlliedPvt.Ltd.
7. Biochemistry–RamaRao.A,RatnaKumari.D,Kalyani-Publishers.

P.R.GOVERNMENT COLLEGE(A), KAKINADA

CHOICE BASED CREDIT SYSTEM
SEMESTER-I PAPER-I

AT THE END OF I SEMESTER
ADMITTED BATCH 2021-2022

BIOMOLECULES-I MODEL PRACTICAL PAPER

Time: 1 1/2 hrs.

Marks: 50M

I. Qualitative test for Identification of amino acids

Principle and Procedure--

06Marks

Conduct of Experiment

08Marks 20Marks

Report

06Marks



2. Titration curve of glycine and determination of pK_a and pI values.

Principle and Procedure

4Marks

Conduct of Experiment

8Marks

15 Marks



Report

3Marks

3. Practical Record

10Marks

4. VivaVoice

5Marks

TOTAL

50Marks
