

**GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAHMUNDRY**

DEPARTMENT OF BIOTECHNOLOGY



BOARD OF STUDIES

2015-2016

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
DEPARTMENT OF BIOTECHNOLOGY
Consolidated Report of Board of Studies for the year 2015 – 2016

The Board of studies of Biotechnology Department was convened on 19- 03-2015 at 11.30 A.M under the Chairmanship of **K.Vasudha**, Lecturer In-charge, Department of Biotechnology.

The following members were present:

S. No	Name		Signature
1.	Dr.A.Matta Reddy, Asossiate Professor, Dept.of Zoology, Aadikavi Nannaya University, Rajahmundry.	University Nominee	
2	Dr.K.Sarala, Principal Scientist, Crop Improvement Division, CTRI, Rajahmundry.	Scientist (Industrial Nominee)	
3	Sri. K.Suresh Babu, Lecturer in Biotechnology, ABN college, Kovuru, W.G.Dist. A.P.	Subject expert	
4	K.Vasudha, Lecturer incharge, Dept of- Biotechnology.	Staff Member	
5.	Dr.B.Nageswari, Lecturer, Dept.of Biotechnology.	Staff Member	
6		Student	
7		Student	

The following documents are submitted to the Academic coordinator and Controller of Examinations:

1. Resolutions of Board of Studies Meeting.
2. Syllabi of I, II, III, IV, V, and VI semesters.
3. Model question papers of all semesters which include both theory and practical's for Paper I, II, III,& IV.
4. List of revised Examiners (if any)

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
Board of Studies Meeting 2015– 2016
Department of Biotechnology – Approved List of Examiners/Paper setters

S.No	Name of the Lecturer/Reader	Name of the college
1.	Lecturers in service	PR college(A), Kakinada
2.		Ideal Degree College(A), Kakinada
3.		ASD Govt.College for Women, Kakinada
4.		VS Lakshmi College, Kakinada
5.		DNR college(A), Bhimavaram
6.		K.G.R.L College(A), Bhimavaram
7.		CR Reddy College(A), Eluru
8.		Y.N.College(A), Narsapur
9.		S.K.B.R college(A), Amalapuram
10.		VS Krishna Govt.college, Visakhapatnam
11.		Women's college, Visakhapatnam
12.		SRR college, Vijayawada
13.		Govt.college for Men, Srikakulam
14.		Govt.college for Women, Srikakulam
15.		AVN Degree college, Kakinada
16.		ABN college, Kovuru, W.G.Dist.A.P

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
DEPARTMENT OF BIOTECHNOLOGY
Board Of Studies Meeting Minutes

The BOS meeting in Biotechnology subject for the year 2015-2016 was held in the Department of Biotechnology on 19-03-2015 at 11:30AM with **K.Vasudha**, Lecturer In Charge, in the Chair along with the following members.

- 1.University Nominee (Member) : **Dr.A.Matta Reddy**,
Associate Professor,
Dept.of Zoology,
AKNU,
Rajahmundry.

2. Industrial Nominee (Scientist) : **Dr.K.Sarala**,
Principal Scientist,
Crop improvement division,
CTRI, Rajahmundry

3. Subject Expert (Member) : **Sri. K.Suresh Babu**,
Lecturer in Biotechnology,
ABN college, Kovuru,
W.G.Dist. A.P.

4. Faculty Member : **K.Vasudha**, Lecturer incharge,
Dept.of Biotechnology

5. Faculty Member : **Dr.B.Nageshwari**, Lecturer
Dept.of Biotechnology

6. Student Member :

7. Student Member :

The members present discussed various aspects of the Syllabi, Model Question Papers of both Theory and Practical for three year B.Sc., degree course in Biotechnology that is to be implemented for the academic year 2015-2016 and resolved the following.

Resolutions:

1. **CBCS(Choice Based Credit System)** has been introduced from 2014-15 for I year and for II year from 2015-16 as prescribed by **Commissionerate of collegiate Education, A.P**
2. The common core curriculum prescribed by **Aadikavi Nannaya University** has been adopted for I and II years and the syllabus is divided into modules.
3. The common core curriculum prescribed by AP State Council of Higher Education, for III year B.Sc (Biotechnology) has been adopted since the course is run in semester system in this college the syllabus is divided equally into two semesters.
4. To adopt the same Question paper model for I and II years as prescribed by CCE for CBCS and for III year as prescribed by AKNU, Rajahmundry.
5. **Additional inputs** included in each paper and in each semester for all the three years in addition to the syllabus prescribed (20% of addition).
6. As a part of CBCS and Modular system the Unit on “Biostatistics and Bioinformatics” has been converted to subject elective paper.
7. Unit on “ Microbiology” has been introduced into I year (II semester- Module-II) and Unit on “ Plant Biotechnology” has been introduced into II year (IV semester – Module-IV).
8. Dept.of Biotechnology has proposed two **Inter disciplinary electives - (General Electives)** on “**Biofertilizer Technology**” and “**Nursery and**

Gardening” for B.Sc(Maths / Statistics) , B.A, B.Com students (Non life science background) in IV semester which has allocated 2 credits.

9. The internal assessment component is given as follows:

For I and II year students(CBCS pattern) – Theory examination :

Total -100M

External exam – 75 marks

Internal exam – 25 marks ----- 5 marks for Assignment
5 marks for Seminar
5 marks for Viva-voce
10 marks for written exam

For III year students(NOn CBCS pattern) – Theory examination:

Total -100M

External exam – 75 marks

Internal exam – 25 marks----- 15 marks for Written exam
10 arks for Viva-voce

10. Practical exams would be conducted at the end of even no. semester for all the three years.

Practical – Year End Exam - 75 marks

Internal Exam - 25 marks

Total - 100 marks

11. The methodology of teaching is based on ICT, Internet Open access, Power point and Teaching method.

12. The scheme of Model question papers for each module was framed at the end of the syllabus and the list of examiners were also approved.

Signature of the members present: -

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**GOVERNMENT COLLEGE (A), RAJAHMUNDRY
DEPARTMENT OF BIOTECHNOLOGY
ADDITIONAL INPUTS INTO SYLLABUS 2015-2016**

The topics which are related to the prescribed syllabus, which are of importance either as academic or application are selected and included in the syllabus as Additional inputs. The information regarding the research activities and achievements of various Local / Regional organizations, like CTRI,SIFT,CIFE is collected and considered as a part of the curriculum of B.Sc Biotechnology course so as to encourage the students to opt for research in this vast field of science.

I B.Sc : MODULE I - Regulation and Importance of Cell Cycle

MODULE II - Culture media and selective media for isolation of microbes.

**II B.Sc: MODULE III - Biochemical disorders – Phenylketonuria, Alkaptonuria,
Haemophilia**

MODULE IV- Medicinal plants for common ailments (Domestic remedies)

III B.Sc : V Semester

Paper III - Inhibitors of Protein Synthesis

Paper IV - Applications of Animal & Industrial Biotechnology

VI Semester

**Paper III - Molecular markers- RFLP, RAPD- Procedure and
Applications.**

Paper IV - Transgenic plants production – Bioinsecticides

Members:

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GOVERNMENT COLEGE (A), RAJAHMUNDRY
I B.SC BIOTECHNOLOGY
MODULE I -- CELL BIOLOGY
CORE - I: Theory Syllabus – 2015-2016.

Total credits: 3

Total Hours: 60

Cell Structure, Function and Cell Division (30hrs)

Unit I

1. Cells as basic units of living organisms - Viral, Bacterial, Fungal, Plant and Animal cells
2. Ultra structure of Prokaryotic cell (Cell membrane, Plasmids)
3. Ultra structure of eukaryotic cell (Cell wall, Cell membrane, Mitochondria,
4. Chloroplast, Endoplasmic reticulum, Golgi apparatus, Vacuoles)

Unit II

1. Chromosome organization in Prokaryotes and Eukaryotes
2. Structure of specialized chromosomes (Polytene and Lampbrush)
3. Cell division and Cell cycle
4. Significance of mitosis and meiosis

Additional Input: Regulation and Importance of Cell Cycle

Structure and Function of Nucleic acids (30hrs)

Unit III

1. DNA as the genetic material – Griffith's experiments on transformation in *Streptococcus pneumoniae*. Avery, McEleod and Mc Carty's experiments. Hershey – Chase experiments with radio-labelled T₂ bacteriophage
2. RNA as genetic material – Tobacco Mosaic Virus
3. Structure of DNA – Watson and Crick Model; Forms of DNA – A, B and Z forms of DNA, Super coiled and relaxed DNA – Role of topoisomerases.

Unit IV

1. DNA replication – Models of DNA Replication (Semi-conservative, non-conservative models) Mechanisms of DNA replication – Linear and circular – Rolling circle and Theta mechanism of replication.
2. DNA Damage and Repair

Reference Books:

1. Genetics – By Gardner (McMillan Press)
2. An Introduction to Genetic Analysis – By Griffith and others- Freeman & Company
3. Biotechnology – By K. Trehan
4. Cell and Molecular Biology – By De Robertis
5. Cell and Molecular Biology – By Lodish
6. Cell Biology and Genetics – By P. K. Gupta
7. Biotechnology - K. Trehan
8. Biotechnology – I - R.S. Setty and G.R. Veena
9. Biotechnology – II - R.S. Setty and V. Sreekrishna
10. Molecular Biology - David Friefeilder
11. Cell Biology - By S.C. Rastogi (New Age International (P) Ltd)
12. The World of the Cell - By Becker (Pearson Education)

Members:

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GOVERNMENT COLEGE (A), RAJAHMUNDRY
I B.Sc., Biotechnology
Module – I (At the end of Core-I) CELL BIOLOGY
Question Paper Design and Guidelines to Paper setter

Time : 3 Hours

Max.Marks : 75

Essay questions : (with Internal choice) 10 X 4 = 40M

4 from cell structure, function and cell division - Unit - I & Unit - II

4 from Structure and function of Nucleic acids - Unit – III & Unit – IV

Short notes : 4 from cell structure, function and cell division. 5 X 3 = 15M

4 from Structure and function of Nucleic acids.

Very short notes : 5 from cell structure, function and cell division. 10X2=20M

5from Structure and function of Nucleic acids.

BLUE PRINT

Name of the Unit	No.of Essays	No . of Short answers	No. of very short Answers	Weightage of Marks
cell structure, function and cell division-Unit – I &Unit – II	4	4	5	4x10=40 4x3=12 5x2=10
Structure and function of Nucleic acids - Unit - III & Unit - IV	4	4	5	4x10=40 4x3=12 5x2=10

Members: 1.

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GOVERNMENT COLEGE (A), RAJAHMUNDRY
I B.Sc., Biotechnology Module – I (At the end of Core I)
CELL BIOLOGY - Model Question Paper

Time : 3 hrs

Max . Marks : 75

SECTION – A

Answer ALL the questions

4 X 10 = 40M

- 1.a) Explain about Ultra structure of Prokaryotic cell. (or)
b) Write about structure of specialized Chromosomes
2. a) Write an essay on Meiosis and its significance (or)
b) Describe about chloroplast and Endoplasmic reticulum
3. a) Prove DNA as the genetic material with any two experiments.(or)
b) Explain about Watson and Crick model of DNA structure.
4. a) Explain about semi conservative model of DNA replication. (or)
b) Explain any three DNA Repair mechanisms

SECTION – B

Write Short notes on any *THREE* of the following.

3 X 5 = 15M

- | | |
|---|------------------------------------|
| 7.Plasmids | 8.Structure of Virus |
| 9.Mitosis | 10.Theta mechanism of replication. |
| 11.Topoisomerases and their role
in replication. | 12. Prove RNA as Genetic material |
| 13.Mitochondria | 14.structure of chromosome |

SECTION – C

Answer ALL of the following Questions.

10 X 2 = 20M

- | | |
|----------------|------------------|
| 1.Euchromatin | 4. DNA Gyases |
| 2.Nucleoid | 5.Nucleotide |
| 3.Cyclins | 6.Transformation |
| 7.Karyokinesis | 8.Crossing over |
| 9.capsule | 10.chitin |

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
I B.Sc BIOTECHNOLOGY
Module II – GENETICS and MICROBIOLOGY
Core -II: Theory Syllabus - 2015-2016

Total credits: 3

Total Hours: 60

Mendel's Laws and Mechanism of Inheritance (30 hours)

Unit I

1. Mendel's experiments – Factors contributing to success of Mendel's experiments
2. Law of segregation – Monohybrid ratio
3. Law of Independent assortment – Dihybrids, Trihybrids
4. Deviation from Mendel's Laws - partial or incomplete dominance, co-dominance
5. Penetrance and expressivity, pleiotropism
6. Epistatic gene interaction – Modified dihybrid ratios (12:3:1; 9:7; 15:1; 9:3:4:, 9:6:1; 13:3)

Unit II

1. Genes and environment – phenocopies
2. Linkage and recombination – Discovery of linkage, cytological proof of crossing over
3. Recombination frequency and map distance
4. Interference and coincidence
5. Mitotic crossing over in *Drosophila*
6. Mechanism of sex determination-geneic balance theory - *Drosophila*
7. Homogametic and Heterogametic theory (Human, Mammalian, Birds)
8. X – linked inheritance (eg. Haemophilia)

Fundamentals of Microbiology (30 hours)

Unit III

1. Outlines of classification of micro organisms
2. Structure, Identification and general characters of Viruses, Bacteria, Fungi and Micro Algae (One example from each group)
3. Disease causing pathogens and their symptoms (examples; Typhoid, HIV only)

Unit IV

1. Isolation, identification and preservation of microorganisms (Bacteria)
2. Methods of sterilization
3. Bacterial reproduction and growth kinetics (Batch and continuous cultures)
4. Pure cultures and cultural characteristics

Additional Input:

Culture media and selective media for isolation of microbes.

Recommended Books

1. Genetics - By Gardner (Macmillan Press)
2. An introduction to Genetic Analysis - By Griffith and others – Freeman and Company
3. Statistical Genetics – Principles and Practice - By Prem Narain
4. Fundamentals of Genetics – By B.D. Singh, N. Pratibha, P.H. Rao and P.B. Kavi Kishor
5. Genetics - By B.D. Singh
6. Theory and Problems in Genetics - By Stransfield
7. Genetics - By Strickberger (Pearson Education)
8. Text Book of Microbiology - By Ananthanarayan and Paniker
9. Microbiology - B.J. Pelczar, E.S.N. Cfan and N.R. Kreig, McGraw Hill Publ.
10. General Microbiology – By Stanier, R.Y, J.L. Ingrahm, M.L. Wheel is & P.R. Painter
11. General Microbiology – By Powar (Vol. I and Vol. II).
12. Practical Microbiology - By Aneja.

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.

I B.Sc BIOTECHNOLOGY

**Module – II GENETICS and MICROBIOLOGY (At the end of Core - 2)
Question Paper Design and Guidelines to Paper setter**

Time : 3 Hours

Max . Marks : 75

Essay questions : (with Internal choice)

10 X 4 = 40M

4 from - Mendel's Laws and Mechanism of Inheritance Unit - I & Unit - II

4 from - Fundamentals of Microbiology Unit – III & Unit – IV

Short notes :

5 X 3 = 15M

4 from - Mendel's Laws and Mechanism of Inheritance Unit - I & Unit - II

4 from - Fundamentals of Microbiology

Very short notes :

10X2=20M

5 from - Mendel's Laws and Mechanism of Inheritance Unit - I & Unit - II

5from - Fundamentals of Microbiology

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Name of the Unit	No.of Essays	No . of Short answers	No. of very short Answers	Weightage of Marks
Mendel's Laws and Mechanism of Inheritance Unit – I & Unit – II	4	4	5	4x10=40 4x3=12 5x2=10
Fundamentals of Microbiology Unit - III & Unit - IV	4	4	5	4x10=40 4x3=12 5x2=10

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
I B.Sc., Biotechnology– MODULE II (At the end of Core-2)
GENETICS and MICROBIOLOGY- Model Question Paper

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer ALL the following Questions

4 X 10 = 40M

1. a) Define law of Independent Assortment and explain about Dihybrid cross with example. (or)
b) Describe about cytological proof of crossing over.
2. a) Explain about mechanism of sex determination . (or)
b) write about the modified Dihybrid ratios – 12:3:1, 9:3:4, 9:7
3. a) Give detail account on Isolation ,Identification and Preservation of Microorganisms. (or)
b) Write different methods of sterilization techniques
4. a) Write in detail about classification of Microorganisms (or)
b) Briefly describe about Bacterial Reproduction.

SECTION – B

Answer any FIVE of the following Questions.

5 X 3 = 15M

- | | |
|-----------------|--------------------------|
| 5. Pleiotropism | 9. Typhoid |
| 6. Epistasis | 10. Incomplete dominance |
| 7. Bactriophage | 11. Fungal cell |
| 8. Linkage | 12. Pure cultures |

SECTION – C

Answer ALL the following Questions

10x2=20M

- | | |
|--------------------|----------------------|
| 13. Test cross | 18. HIV |
| 14. Hemophilia | 19. Batch culture |
| 15. Map distance | 20. Autoclave |
| 16. Co – dominance | 21. cryopreservation |
| 17. Phenocopies | 22. Laminar airflow |

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
I B.Sc BIOTECHNOLOGY
Module I & II -- CELL BIOLOGY, GENETICS, MICRO BIOLOGY
Practical Syllabus - 2015-2016
(At the end of Core-2)

Practicals (3 hrs/ week)

Total Credits:2

1. Monohybrid and dihybrid ratio in *Drosophila*/maize
2. Estimation of DNA by diphenylamine method
3. Estimation of RNA by orcinol method
4. Preparation of different stages of Mitosis and Meiosis
5. Types of chromosomes
6. Technique of Micrometry (Stage and ocular)
7. Preparation of routine microbiological media.
8. Isolation of common non-pathogenic bacteria
9. Staining and identification of bacteria – *E.coli*, *Pseudomonas*, *Bacillus* and *Staphylococcus*

Practical Model Paper - 2015-2016 (At the end of Core-2)

Module I & II -- CELL BIOLOGY , GENETICS and MICRO BIOLOGY

Time 3 hrs

Max. Marks: 75

1. Estimate the amount of DNA present in the given sample by constructing a standard graph using diphenylamine reagent. 20 M
2. Problem on Monohybrid and Dihybrid ratio in *Drosophila*/Maize. 15M
(or)
Prepare nutrient agar media for bacterial growth. 15 M
3. Spotters (5x5) 25M
4. Record & Viva-voce 15 M
- Total 75 M

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
MODULE-III BIOLOGICAL CHEMISTRY
CORE - III : Theory Syllabus - 2015-2016

Total credits: 3

Total Hours: 60

Biomolecules

(30hrs)

Unit I

1. Carbohydrates: Importance, classification and properties

- a. Structure, configuration and biochemical importance of monosaccharides (glucose and fructose)
- b. Disaccharides – Structure and biochemical importance of sucrose and trehalose; Physiologically important glycosides (streptomycin, cardiac glycosides, ouabain)
- c. Structure and function of homo polysaccharides – starch, inulin, cellulose and glycogen; Structure and function of hetero polysaccharides – hyaluronic acid

2. Proteins: Classification, structure and properties of amino acids

- a. Peptide bond – synthesis and characters
- b. Primary, secondary, tertiary and quaternary structures of proteins

Unit II

3. Lipids: a. Fatty acids – saturated and unsaturated

- b. Triacylglycerols, Sphingolipids, Sterols, Phospholipids (phosphatidic acid, phosphatidylcholine)

4. Enzymes: Classification and nomenclature; Kinetics of enzyme catalysed reactions

- a. Factors influencing enzymatic reactions – pH, Temperature, Substrate concentration, Enzyme concentration
- b. Enzyme inhibition – Competitive and non- competitive

Intermediary Metabolism (30hrs)

Unit III

- a. Glycolysis
- b. Citric acid cycle
- c. Gluconeogenesis and its significance
- d. Mitochondrial electron transport, Chemiosmotic theory of ATP synthesis
- e. β -Oxidation of fatty acid
- f. Deamination, Decarboxylation and transamination reactions of amino acids

Unit IV

- a. Catabolism of amino acids – phenylalanine and tyrosine (phenylketonuria and albinism)
- b. Photosynthesis – Light reaction and photophosphorylation
- c. Carbon assimilation

Additional Input:

Biochemical disorders – Phenylketonuria, Alkaptonuria, Haemophilia.

Recommended Books

1. Biochemistry – By Dr. U. Satyanarayana, U. Chakrapani
2. Biochemistry – By J.L. Jain
3. Biochemistry – By Lehninger
4. Biochemistry – By Stryer
5. Biochemistry – By Voet and Voet
6. Biochemistry (Jaypee) – By Vasudevan
7. Textbook of Medical Biochemistry – By S. Ramakrishnan, R. Rajan, and K.G. Prasanna (Orient Longman)
8. Biochemistry – By K Trehan
9. Biochemical methods – By S.Sadasivam and A.Manickam
10. An introduction to Practical Biochemistry – By T. Plummer

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY MODULE-III(At the end of CORE – III)
CORE – III :BIOLOGICAL CHEMISTRY
BLUE PRINT- 2015-2016

Question Paper Design and Guidelines to Paper setter

Time : 3 Hours

Max . Marks : 75

Essay questions : (with Internal choice)

10 X 4 = 40M

4 from - Biomolecules Unit - I & Unit - II

4 from - Intermediary Metabolism Unit – III & Unit – IV

Short notes :

5 X 3 = 15M

4 from - Biomolecules Unit - I & Unit - II

4 from - Intermediary Metabolism Unit – III & Unit – IV

Very short notes :

10X2=20M

5 from - Biomolecules Unit - I & Unit - II

5from - Intermediary Metabolism Unit – III & Unit – IV

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Name of the Unit	No.of Essays	No . of Short answers	No. of very short Answers	Weightage of Marks
Biomolecules. Unit – I Unit – II	4	4	5	4x10=40 4x3=12 5x2=10
Intermediary Metabolism. Unit - III Unit - IV	4	4	5	4x10=40 4x3=12 5x2=10

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
MODULE-III BIOLOGICAL CHEMISTRY
CORE - III

Model Question Paper(At the end of Core-III) –OCT/NOV– 2015

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer **ALL** the following Questions

4 X 10 = 40M

- 1.a) what are Carbohydrates and classify them with examples and write their importance. (or)
b) Explain in detail about various structural level of protein organization.
- 2.a) write an essay on classification of lipids (or)
b) Write about kinetics of Enzymes
- 3.a) Explain various steps involved in citric acid cycle add a note on ATP synthesis. (or)
b) What is Mitochondrial Electron Transport chain?
- 4.a) Define Photosynthesis and add a note on light reactions of photosynthesis?
(or)
b) Describe about catabolism of Phenyl alanine

SECTION – B

Answer ***any FIVE*** of the following Questions.

5 X 3 = 15M

5. Structure and Functions of Cholesterol
6. Factors effecting enzymatic reaction
7. β - Oxidation of fatty acids.
8. Transamination.
9. Explain the structure and properties of Phospholipids.
10. Structure and Biochemical importance of starch.
11. Glycolysis
12. Deamination

SECTION – C

Answer ***ALL*** of the following Questions

10 X 2 = 20M

- | | |
|---------------------|---------------------------|
| 13. Lipoproteins | 14. Structure of Fructose |
| 15. Cellulose | 16. Streptomycine |
| 17. Phospholipids | 18. Essential amino acids |
| 19. Gluconeogenesis | 20. Decarboxilation |
| 21. Epimers | 21. Albinism |

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
MODULE-IV PLANT BIOTECHNOLOGY AND BIO PHYSICAL TECHNIQUES
CORE – IV : Theory Syllabus – 2015-2016

Total credits: 3

Total Hours: 60

Plant Biotechnology

(30hrs)

Unit I

- a. Composition of media(Murashige and Skoog's and Gamborg's only)
- b. Preparation of media and methods of sterilization
- c. Role of Plant growth regulators in differentiation
- d. Induction of callus
- e. Meristem culture and production of virus free plants
- f. Clonal propagation of plants on a commercial scale(Somatic embryogenesis and organogenesis)

Unit II

- g. Mass cultivation of cell cultures and process engineering – batch and
- h. continuous cultures, Bioreactors.
- i. Production of commercially useful compounds by plant cell culture
- j. Methods of gene transfer techniques(Agrobacterium, Microprojectile
- k. bombardment)
- l. Applications of recombinant DNA technology in agriculture
- m. Production of therapeutic proteins from transgenic plants

Additional Input: Medicinal plants for common ailments (Domestic remedies)

Biophysical Techniques

(30hrs)

Unit III

- a. Microscopy – Light, Inverted, Fluorescent and Electron microscopy
- b. Colorimetry – Beer-Lambert's law
- c. UV- VIS Spectrophotometry
- d. Chromatography – Paper, Thin Layer, Ion exchange, Gel-filtration

Unit IV

- a. Electrophoresis – Native gels and SDS-PAGE, Agarose
- b. Centrifugation and filtration – Basic Principles
- c. Dialysis and lyophilization
- d. Radio isotopes and their uses in biology

Recommended Books

1. Introduction to Plant Tissue culture – By M.K.Razdan
2. Introduction to Plant Biotechnology – By H.S.Chawla
3. Bioprocess Engineering – By Shuler
4. Plant tissue culture – By Kalyan Kumar De
5. Biochemistry – By Dr. U. Satyanarayana, U. Chakrapani
6. Biochemistry – By J.L. Jain
7. Biochemistry – By Lehninger
8. Biochemistry – By Stryer
9. Biochemistry – By Voet and Voet
10. Biochemistry (Jaypee) – By Vasudevan

Members:

- 1.
- 2.
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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
MODULE-IV : PLANT BIOTECHNOLOGY AND BIO PHYSICAL TECHNIQUES
CORE - IV : BLUE PRINT- 2015-2016
Question Paper Design and Guidelines to Paper setter

Time : 3 Hours

Max . Marks : 75

Essay questions : (with Internal choice) 10 X 4 = 40M
 4 from - Plant Biotechnology Unit - I & Unit - II
 4 from - Biophysical Techniques Unit – III & Unit – IV
 Short notes : 5 X 3 = 15M
 4 from - Plant Biotechnology. Unit - I & Unit - II
 4 from - Biophysical Techniques Unit – III & Unit – IV
 Very short notes : 10X2=20M
 5 from- Plant Biotechnology Unit - I & Unit - II
 5from - Biophysical Techniques Unit – III & Unit – IV

BLUE PRINT

Name of the Unit	No.of Essays	No . of Short answers	No. of very short Answers	Weightage of Marks
Plant Biotechnology Unit – I&Unit – II	4	4	5	4x10=40 4x3=12 5x2=10
Biophysical Techniques Unit - III&Unit - IV	4	4	5	4x10=40 4x3=12 5x2=10

Members: 1.

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
MODULE-IV PLANT BIOTECHNOLOGY AND BIO PHYSICAL TECHNIQUES
CORE – IV

Model Question Paper(At the end of Core-IV) –MAR/APR– 2016

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer ALL of the following Questions

4 X 10=40M

- 1.a) Give a brief account on plant tissue culture media composition and its sterilization.
(or)
b) Write about Agro bacterium mediated gene transfer technique.
2. a) Applications of r-DNA technology in agriculture. (or)
b) What is an Electron Microscope? Explain their types with applications ?
3. a) Give the working principle, procedure and applications of Gel Electrophoresis?
(or)
b) What is Radioisotopes and their uses in biology?
4. a) Describe about Production of Therapeutic proteins (or)
b) Explain the principle and applications of Ion exchange chromatography

SECTION – B

Write Short notes on any FIVE of the following.

5 X 3 = 15M

- | | |
|----------------------------------|--------------------------------|
| 5. Induction of callus. | 6. Paper Chromatography |
| 7. Micro projectile bombardment. | 8. Agarose Gel Electrophoresis |
| 9. Batch and continuous culture. | 10. Spectrophotometer |
| 11. Bioreactor | 12. Dialysis |

SECTION – C

Answer ALL of the following Questions

10 X 2=20M

- | | | |
|-----------------|----------------------|---------------------|
| 13. Explant | 14. SDS | 15. Organogenesis |
| 16. Colorimeter | 17. Transgenic Plant | 18. Resolving power |
| 19. TLC | 20. Centrifugation | 21. Ti plasmid |
| 22. Auxins | | |

Members: 1.

2.

3.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
PRACTICALS: BIOLOGICAL CHEMISTRY PLANT BIOTECHNOLOGY AND
BIO PHYSICAL TECHNIQUES
(At the end of Core-IV)

1. Preparation of Normal, Molar and Molal solutions
2. Preparation of buffers (Acidic, Neutral and Alkaline buffers)
3. Qualitative tests of sugars, amino acids and lipids
4. Estimation of protein by Biuret method
5. Estimation of total sugars by anthrone method
6. Separation of amino acid by paper chromatography
7. Electrophoretic separation of proteins (SDS-PAGE)
8. Preparation of media, and initiation of callus from any one selected plant species
9. Micropropagation of plants(any one)
10. Preparation of synthetic seeds

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
II B.Sc BIOTECHNOLOGY
Practical Model Paper - 2015-2016
(At the end of core IV)

Time – 3 hrs

Max. Marks: 75

- | | |
|--|-------------|
| 1. Qualitative / Quantitative estimation of Biomolecules | 20 M |
| 2. Prepare Plant Tissue culture media. | 15 M |
| 3. Spotters | (5x5) 25M |
| 4. Record & Viva-voce | <u>15 M</u> |

Total 75 M

GENERAL ELECTIVE I

MODULE IV - NURSERY AND GARDENING

UNIT- I

Nursery: definition, objectives and scope and building up of infrastructure for nursery, planning and seasonal activities - Planting - direct seeding and transplants.

Seed: Structure and types - Seed dormancy; causes and methods of breaking dormancy - Seed storage: Seed banks, factors affecting seed viability, genetic erosion - Seed production technology - seed testing and certification.

UNIT- II

Vegetative propagation: air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants - green house - mist chamber, shed root, shade house and glass house.

UNIT- III

Gardening: definition, objectives and scope - different types of gardening - landscape and home gardening - parks and its components - plant materials and design - computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting.

UNIT- IV

Sowing/raising of seeds and seedlings - Transplanting of seedlings - Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots - Storage and marketing procedures.

REFERENCES:

1. Bose, T.K.&Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.

GENERAL ELECTIVE I
MODULE IV - NURSERY AND GARDENING
Model Question Paper and Blue Print

Time: 1^{1/2}hr

Max.Marks:40

PART-I

Answer any **TWO** questions from the following

2x10=20M

1. Define Nursery and explain its objectives, scope and infrastructure facilities.
2. Write an essay on Vegetative propagation of Plants.
3. Describe about different types of Gardening.
4. Write about cultivation of Tomatoes and Brinjal.

PART-II

Write short notes on any **FOUR** of the following

4x5=20M

5. Seed Dormancy
6. Green House
7. Manuring
8. Management of Pests
9. Storage of Vegetables
10. Seed testing

@@@@@

Blue Print

Theory Paper – 40marks ; Record work – 10marks

Part – I : Four questions from Four Units

Part – II : Two questions from Unit-I
One question from Unit – II
Two questions from Unit – III
One question from Unit - IV

GENERAL ELECTIVE II

MODULE IV - BIOFERTILIZER TECHNOLOGY

UNIT-I

An introduction to fertilizers, synthetic fertilizers, natural fertilizers, inorganic fertilizers, organic fertilizers, bio-fertilizers - importance, advantages and constraints.

UNIT-II

Isolation, culturing methods, enumeration and identification of microbial species - Rhizobium, Azospirillum Azotobacters, blue green algae and phosphate solubilisers. Morphology of Rhizobium, Azospirillum, Azotobacters, blue green algae and phosphate solubilisers and maintenance - inoculant preparation.

UNIT-III

Preparation of microbial inoculants - large-scale production of microbes - their application as biofertilizers - crop responses to biofertilizers.

UNIT-IV

Azolla - distribution, morphological and biochemical characteristics - cyanobacterial symbionts - azolla biofertilizer technology - organic matter and composting - method of processes, applications and limitations.

References:

1. N.S.Subba Rao(2000), Biofertilizers in Agriculture. Oxford & IBH publishing Co., New Delhi.
2. Daniel Sundararaj.D. and G.Thulasidas.(1993). Botany of Field Crops.(2nd Ed.) Macmilan India Ltd.
3. Jeswani .L.M and Baldev, B.(1990). Advances in Pulse production technology, ICAR, New Delhi.

GENERAL ELECTIVE II
MODULE IV - BIOFERTILIZER TECHNOLOGY
Model Question Paper and Blue Print

Time: 1^{1/2}hr

Max.Marks:40

PART-I

Answer any **TWO** questions from the following

2x10=20M

1. Define Biofertilizer and explain various types of Biofertilizers.
2. Isolation ,identification and culturing on Microbial species.
3. Write about Applications of Biofertilizers.
4. Write an essay on morphological and biochemical characters of Azolla.

PART-II

Write short notes on any **FOUR** of the following

4x5=20M

5. Blue green algae
6. Organic fertilizers
7. Phosphate solubilizers
8. Morphology of Rhizobium
9. Inoculum preparation of Azatobacter
10. Composting of Azolla

@@@@@

Blue Print

Theory Paper – 40marks ; Record work – 10marks

Part – I : Four questions from Four Units

Part – II : Two questions from Unit-I
One question from Unit – II
Two questions from Unit – III
One question from Unit - IV

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
III B. SC BIOTECHNOLOGY
Paper III - MOLECULAR BIOLOGY AND GENETIC ENGINEERING AND
IMMUNOLOGY
V Semester : Theory Syllabus – 2015-2016

SECTION-A

Gene and Genome Organization

Unit I

- 1.1 Organization of nuclear genome – Genes and gene numbers – essential and non essential genes.
- 1.2 Denaturation and renaturation of DNA – T_m values and Cot curves
- 1.3 Kinetic classes of DNA – Single copy sequences, and repeated sequences, inverted, tandem and palindromic repeats.
- 1.4 Satellite DNA

Unit II

- 1.5 Mitochondrial genome organization(eg: Human)
- 1.6 Chloroplast genome organization in plants
- 1.7 Organization of Eukaryotic genes – Exons, Introns, Promoters and Terminators.
- 1.8 Gene families and clusters – eg:Globin gene, histones and ribosomal genes.

SECTION-B

Gene Expression and Gene Regulation

Unit I

- 2.1 Prokaryotic and Eukaryotic Transcription
Post – transcriptional modifications (Capping, Polyadenylation, Splicing and alternate splicing)
- 2.2 Translation

Unit II

- 2.3 Genetic code and its features, Wobble hypothesis

Synthesis of Polypeptides – Initiation, elongation and termination in Prokaryotes and eukaryotes.

- 2.4 Regulation of Gene expression in Prokaryotes and eukaryotes
Operon concept in Bacteria – Lac Operon.

Additional Input: Inhibitors of Protein Synthesis

Recommended Books:

1. Cell and Molecular Biology – By Roberties & Roberties
2. Molecular Biology & Biotechnology – By H.D.Kumar
3. Molecular Biotechnology – By G.R.Glick
4. Molecular Biology of Gene – By Watson
5. Microbial Genetics – By S.R.Maloy
6. Molecular Biology – By David Freifelder
7. Cell and Molecular Biology – By S.C.Rastogi

Members:

- 1.
- 2.
- 3.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Sc., Biotechnology Paper – III (At the end of V Semester)
MOLECULAR BIOLOGY, GENETIC ENGINEERING AND IMMUNOLOGY
Model Question Paper –OCT/NOV– 2015

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer ALL of the following Questions.

6 X 2 = 12M

- | | |
|-----------------|-----------------|
| 1. Gene | 4. Promoters |
| 2. Genetic code | 5. Denaturation |
| 3. Histones | 6. Codon |

SECTION – B

Write Short notes on any THREE of the following.

3 X 5 = 15M

7. Single copy sequences
8. Wobble Hypothesis
9. Inhibitors.
10. Satellite DNA.
11. T_M Value
12. Splicing.

SECTION – C

Answer any FOUR of the following choosing at least two Questions from Part – A & Part – B.

4 X 12 = 48M

PART – A

13. Write an essay on Organization of Nuclear Genome.
14. Give an account on Mitochondrial Genome organization.
15. Write an account on organization of Eukaryotic Genes.

PART – B

16. Write an essay on post transcriptional modifications?
17. Explain Translation process in prokaryotes and what are the steps involved in it?
18. Describe about Lac operon concept in Bacteria ?

Members :

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GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
III B. SC BIOTECHNOLOGY
Paper IV – APPLICATIONS OF BIOTECHNOLOGY
V Semester : Theory Syllabus – 2015-2016

SECTION-A

Animal Biotechnology

Unit I

- 1.1 Introduction to Animal Biotechnology
- 1.2 Principles of Animal cell culture – culture vessels
- 1.3 Cell culture media preparation, Sterilization, types of cultures
- 1.4 Establishment and preservation of cell lines
- 1.5 Explants and cell disaggregation

Unit II

- 1.6 Culture of cells and tissues(including Stem cells and their application)
- 1.7 Invitro fertilization and embryo transfer technology
- 1.8 Methods of gene transfer – Microinjection and viral mediated gene transfer techniques.
Production of transgenic animals and molecular pharming
- 1.9 Principles of Ex vivo and in vivo gene therapy

SECTION-B

Industrial Biotechnology

Unit I

- 2.1 Introduction to Industrial Biotechnology
- 2.2 Primary and secondary metabolic products of microorganisms
- 2.3 Screening and isolation and preservation of industrial microorganisms
- 2.4 Principles of Fermentation Technology
- 2.5 Commercial production of fuels and chemicals by microbial fermentations

- 2.6 Fermentative production of microbial enzymes(amylases, proteases), and antibiotics.

Unit II

- 2.7 Fermentative production of foods and dairy products.
- 2.8 Animal cells as bioreactors; characteristics of bioreactors, expression and over production of targeted proteins – human growth hormones – production of α and β – interferon, monoclonal antibodies.
- 2.9 Good manufacturing practices, Biosafety issues, Bioethics.
- 2.10 Intellectual Property Rights and Patenting issues.

Additional input:

Applications of Animal and Industrial Biotechnology.

Reference Books

1. Biotechnology - By K.Trehan
2. Industrial Microbiology – By L.E.Cadida
3. Elements of Biotechnology – By P.K.Gupta
4. Biotechnology – By R.C.Dubey
5. Biotechnology – By U.Satyanarayana
6. Bioprocess Engineering –By Shuler

Members:

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GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Sc., Biotechnology Paper – IV (At the end of V Semester)
APPLICATIONS OF BIOTECHNOLOGY

Question Paper Design and Guidelines to Paper setter

Time : 3 Hours

Max . Marks : 75

SECTION – A

Very short notes : 3 from Animal Biotechnology 2 X 6 = 12M
 3 from Industrial Biotechnology.

Short notes : 3 from Animal Biotechnology . 5 X 3 = 15M
 3 from Industrial Biotechnology.

Essay questions : With choice 12 X 4 = 48M

3 from Animal Biotechnology - Unit I & Unit II
3 from Industrial Biotechnology - Unit I & Unit II

BLUE PRINT

Name of the Unit	No. of very short Answers	No . of Short answers	No. of Essays	Weightage of Marks
Animal Biotechnology Unit – I Unit – II	3	3	3	3x2=06 3x5=15 3x12=36
Industrial Biotechnology Unit - I Unit - II	3	3	3	3x2=06 3x5=15 3x12=36

Members: 1.

2.

3.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Sc., Biotechnology Paper – IV (At the end of V Semester)
APPLICATIONS OF BIOTECHNOLOGY
Model Question Paper –OCT/NOV– 2015

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer ALL of the following Questions.

6 X 2 = 12M

- | | |
|-----------------|----------------|
| 1. Cell lines | 4. Bioethics |
| 2. Gene therapy | 5. Interferons |
| 3. Stem cells | 6. Penicillin |

SECTION – B

Write Short notes on any THREE of the following. 3 X 5 = 15M

7. Culture vessels used for animal cell culture.
8. Cell Disaggregation
9. Stem cells and their applications.
10. Secondary metabolites.
11. Bioreactors.
12. Intellectual property Rights.

SECTION – C

Answer any FOUR of the following choosing at least two Questions from Part – A & Part – B.

4 X 12 = 48M

PART – A

13. Write an essay on animal cell culture media preparation and sterilization.
14. Give a brief account on In vitro Fertilization and embryo transfer technology
15. Explain about various Gene transfer methods in Animals.

PART – B

16. Write an essay on Screening, Isolation and Preservation of Microorganisms.
17. Describe the production of Penicillin.
18. Write about Production of Monoclonal Antibodies.

Members :

1.

2.

3.

**GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
III B. SC BIOTECHNOLOGY**

**Paper III - MOLECULAR BIOLOGY AND GENETIC ENGINEERING
AND IMMUNOLOGY**

VI Semester : Theory Syllabus – 2015-2016

SECTION-A

Recombinant DNA Technology

Unit I

- 1.1 Enzymes used in gene cloning : Restriction endonucleases, Ligases, Phosphatases, Methylases, Kinases.
- 1.2 Cloning vehicles – Plasmids, Cosmids, Phage vectors, Shuttle vectors,
- 1.3 Baculovirus vector system, Expression vectors – expression cassettes
- 1.4 Construction of genomic and cDNA libraries

Unit II

- 1.5 Identification of cloned genes
- 1.6 Principles involved in Blotting Techniques – Southern, Northern and Western
- 1.7 Principles and applications of PCR Technology
- 1.8 DNA finger printing technique and its applications.

SECTION-B

Basics of Immunology

Unit I

- 2.1 Introduction to immune system – organs and cells of the immune system
- 2.2 Antigens, Haptens – Physico-chemical characteristics

- 2.3 Structure of different immunoglobulins and their functions – primary and secondary antibody responses

Unit II

- 2.4 Antigen – Antibody Reactions
- 2.5 The Major Histocompatibility gene complex and its role in organ transplantation, Generation of antibody diversity
- 2.6 Hypersensitivity – Coombs classification, Types of hypersensitivity
- 2.7 Autoimmune diseases – mechanisms of auto immunity

Additional input:

Molecular markers- RFLP, RAPD- Procedure and Applications.

Reference Books

1. Essential Immunology - By I.Roitt
2. Principles of Gene Manipulation – By R.W.Old & S.B.Primrose
3. Immunology – By Kubey
4. Gene Biotechnology – By Jogdana
5. Gene cloning – By T.A.Brown

Members:

- 1.
- 2.
- 3.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

III B.Sc., Biotechnology Paper – III (At the end of VI Semester)

**MOLECULAR BIOLOGY AND GENETIC ENGINEERING AND
IMMUNOLOGY**

Question Paper Design and Guidelines to Paper setter

Time : 3 Hours

Max . Marks : 75

Very short notes : 3 from Recombinant DNA Technology 2 X 6 = 12M

3 from Basics of Immunology.

Short notes : 3 from Recombinant DNA Technology . 5 X 3 = 15M

3 from Basics of Immunology .

Essay questions : With choice

12 X 4 = 48M

3 from - Recombinant DNA Technology - Unit I & Unit II

3 from - Basics of Immunology . - Unit I & Unit II

BLUE PRINT

Name of the Unit	No. of very short Answers	No . of Short answers	No. of Essays	Weightage of Marks
Recombinant DNA Technology Unit – I Unit – II	3	3	3	3x2=06 3x5=15 3x12=36
Basics of Immunology Unit - I Unit - II	3	3	3	3x2=06 3x5=15 3x12=36

Members: 1.

2.

3.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Sc., Biotechnology Paper – III (At the end of VI Semester)
MOLECULAR BIOLOGY, GENETIC ENGINEERING AND
IMMUNOLOGY

Model Question Paper –MAR/APR- 2016

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer ALL of the following Questions.

6 X 2 = 12M

- | | |
|------------------|-------------------|
| 1. Ligases | 4. Shuttle Vector |
| 2. Cosmid | 5. Hapten |
| 3. Precipitation | 6. RFLP |

SECTION – B

Write Short notes on any THREE of the following. 3 X 5 = 15M

7. Identification of cloned genes.
8. DNA finger printing technique.
9. Molecular scissors.
10. ELISA.
11. MHC
12. Features of an Antigen

SECTION – C

Answer any FOUR of the following choosing at least two Questions from Part – A & Part – B. 4 X 12 = 48M

PART - A

13. Write an essay on Enzymes used in gene cloning.
14. Write an essay on southern blotting and hybridization technique.
15. Write essay on Principles and applications of PCR?

PART – B

16. Write an essay on structure of different immune globulins and their functions?
17. What are Antigen – Antibody Reactions ?
18. Define Hypersensitivity and write about type – I hypersensitivity ?

Members : 1.

2.

3.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.

III B. SC BIOTECHNOLOGY

Paper IV – APPLICATIONS OF BIOTECHNOLOGY

VI Semester : Theory Syllabus – 2015-2016

SECTION-A

Plant Biotechnology

Unit I

- 1.1 Composition of media(Murashige and Skoog's and Gamborg's only)
Preparation of media and methods of sterilizations
- 1.2 Role of Plant growth regulators in differentiation
- 1.3 Induction of callus
- 1.4 Meristem culture and production of virus free plants
Clonal propagation of plants on a commercial scale(Somatic embryogenesis and organogenesis)

Unit II

- 1.5 Mass cultivation of cell cultures and process engineering – batch and continuous cultures, Bioreactors.
- 1.6 Production of commercially useful compounds by plant cell culture
- 1.7 Methods of gene transfer techniques(Agrobacterium, Microprojectile bombardment)
- 1.8 Applications of recombinant DNA technology in agriculture
- 1.9 Production of therapeutic proteins from transgenic plants

SECTION-B

Environmental Biotechnology

Unit I

- 2.1 Introduction to environmental biotechnology
- 2.2 Renewable and non-renewable energy resources

- 2.3 Conventional energy sources and their impact on environment.
- 2.4 Non-conventional fuels and their impact on environment(biogas,bioethanol,microbial hydrogen production)
- 2.5 Microbial analysis of milk, food and water

Unit II

- 2.6 Microbiological treatment of municipal and industrial effluents
- 2.7 Microbial degradation of pesticides and toxic chemicals
- 2.8 Biopesticides and Biofertilizers(Nitrogen fixing, Phosphate solubilizing microorganisms)
- 2.9 Microbial ore leaching
- 2.10 Introduction to Bioremediation

Additional input:

Transgenic plants – Bioinsecticides

Reference Books:

- 1. Introduction to Plant Tissue culture – By M.K.Razdan
- 2. Introduction to Plant Biotechnology – By H.S.Chawla
- 3. Bioprocess Engineering – By Shuler
- 4. Plant tissue culture – By Kalyan Kumar De

Members:

- 1. 3.

- 2.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Sc., Biotechnology Paper – IV (At the end of VI Semester)
APPLICATIONS OF BIOTECHNOLOGY

Question Paper Design and Guidelines to Paper setter

Time : 3 Hours

Max . Marks : 75

Very short notes : 3 from Plant Biotechnology.

2 X 6 = 12M

3 from Environmental Biotechnology.

Short notes : 3 from Plant Biotechnology .

5 X 3 = 15M

3 from Environmental Biotechnology.

Essay questions : With choice

12 X 4 = 48M

3 from - Plant Biotechnology - Unit I & Unit II

3 from - Environmental Biotechnology - Unit I & Unit II

BLUE PRINT

Name of the Unit	No. of very short Answers	No . of Short answers	No. of Essays	Weightage of Marks
Plant Biotechnology Unit – I Unit – II	3	3	3	3x2=06 3x5=15 3x12=36
Environmental Biotechnology Unit - I Unit - II	3	3	3	3x2=06 3x5=15 3x12=36

Members: 1.

2.

3.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Sc., Biotechnology Paper – IV (At the end of VI Semester)
APPLICATIONS OF BIOTECHNOLOGY
Model Question Paper –MAR/APR – 2016

Time : 3 hrs

Max . Marks : 75

Note : Draw Diagrams wherever necessary.

SECTION – A

Answer *ALL* of the following Questions.

6 X 2 = 12M

- | | |
|---------------|-------------|
| 1. Callus | 4. Biogas |
| 2. Auxins | 5. Leaching |
| 3. Ti Plasmid | 6. Effluent |

SECTION – B

Write Short notes on any *THREE* of the following.

3 X 5 = 15M

7. Induction of callus.
8. Micro projectile bombardment.
9. Batch and continuous culture.
10. Bioethanol production.
11. Biofertilizers.
12. Bioinsecticides.

SECTION – C

Answer any *FOUR* of the following choosing at least two Questions from Part – A & Part – B.

4 X 12 = 48M

PART – A

13. Give a brief account on plant tissue culture media composition and its sterilization.
14. Write about Agro bacterium mediated gene transfer technique.
15. Applications of r-DNA technology in agriculture.

PART – B

16. Write an essay on renewable and non-renewable energy resources.
17. Write an essay on Microbial treatment of Municipal and industrial effluents.
18. Write about Bioremediation.

Members :

1.

2.

3.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.

III B.Sc BIOTECHNOLOGY

Paper-III Molecular Biology, Genetic Engineering and Immunology

Practical Syllabus - 2015-2016

(At the end of VI Semester)

1. Isolation of DNA from Plant/Animal/Bacterial cells
2. Analysis of DNA by Agarose gel electrophoresis
3. Restriction digestion of DNA
4. Immuno-diffusion test
5. ELISA Test
6. Microagglutination using microtiter plates(eg:ABO and Rh Blood grouping)
7. Viability tests of cells/bacteria(Evans blue test or Trypan blue test)
8. Coomb's test
9. Preparation of competent cells of Bacteria
10. Bacterial transformation and selection of transformants under pressure (antibiotic)

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.

III B.Sc BIOTECHNOLOGY

Paper-III Molecular Biology, Genetic Engineering and Immunology

Practical Model Paper - 2015-2016

(At the end of VI Semester)

Time – 3 hrs

Max. Marks: 75

1. Perform micro agglutination test using Micro titer plates and determine the blood group of a given blood sample. - 20 M
2. Isolation of DNA from bacterial cells - 15M
3. Identify and write about the given spotters (5X5) - 25M
4. Record & viva voce - 15M

—————
Total 75 M

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
III B.Sc BIOTECHNOLOGY
Paper-IV – Applications of Biotechnology
Practical Syllabus - 2015-2016

(At the end of VI Semester)

1. Preparation of media, and initiation of callus from any one selected plant species
2. Micropropagation of plants(any one)
3. Preparation of synthetic seeds
4. Production of Wine using common yeast
5. Production of hydrogen or biogas using cow/cattle dung
6. Isolation of microbes from soil or industrial effluents
7. Preparation of Media and culture of animal cells/tissues
8. Cell disaggregation and cell counting
9. Cytotoxicity of the cells using the dye MTT method
10. Estimation of BOD in water samples
11. Production of alcohol by fermentation and estimation of alcohol by colorimetry
12. Production of Biofertilizers(Azolla)
13. Growth curves of bacteria, Measurement of growth in liquid cultures
14. Quality testing of Milk by MBRT

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.

III B.Sc BIOTECHNOLOGY

Paper-IV Applications of Biotechnology

Practical Model Paper - 2015-2016

(At the end of VI Semester)

Time – 3 hrs

Max. Marks: 75

- | | |
|--|------------|
| 1. Estimation of BOD in water samples | - 20M |
| 2. Quality testing of Milk by MBRT | - 15M |
| 3. Identify and write about the given spotters | (5X5) -25M |
| 4. Record & viva voce | - 15M |

Total 75M
