

GOVERNMENT ARTS COLLEGE

(AUTONOMOUS)

SALEM - 636007

NAAC ACCREDITED B++ STATUS

AFFILIATED TO PERIYAR UNIVERSITY, SALEM - 11

M.Sc. BOTANY

**FOR THE CANDIDATES ADMITTED FROM 2017-2018
ONWARDS UNDER CBCS PATTERN**

AFFILIATED TO PERIYAR UNIVERSITY, SALEM -636011

M.Sc. Botany

For the candidates admitted from 2017-2018 onwards under CBCS pattern

1. Condition for Admission

A candidate who has passed B.Sc. Degree in Botany or Botany - VOC - Biotechnology from this Autonomous College or any of the above degree of any other University accepted by the academic council as equivalent there to, subject to such conditions as may be prescribed there to are permitted to appear and qualify for the M.Sc., Degree Examinations of this Autonomous College after a course of study of two academic years.

2. Duration of the Course

The course of Master of Science in Botany shall consists of two academic years divided into Four Semesters

3. Course of Study

The course of study comprises instruction in the following subjects according to the syllabus and books prescribed from time to time.

Semester I

1. Core Course I - Algae Fungi, Lichens and Bryophytes
2. Core Course II -Pteridophytes, Gymnosperms and Palaeobotany
3. Core Course III - Microbiology and Plant Pathology
4. Elective Course I - Plant Resources Utilization and Conservation

Semester II

5. Core Course IV - Practical I
6. Core Course V - Practical II
7. Core Course VI - Anatomy, Embryology and Microtechniques
8. Core Course VII - Cell, Molecular Biology and Genetics
9. Core Course VIII - Environmental Biology
10. Non Major Elective -1 -Human Rights

Semester III

11. Core Course IX - Taxonomy of Angiosperms
12. Core Course X - Plant Physiology and Biophysics
13. Elective Course Paper II - Biotechnology and Bioinformatics
14. Non Major Elective - II - General Studies for competitive Examination

Semester IV

15. Core Course XI - Practical III
16. Core Course XII - Practical IV
17. Core Course XIII - Biochemistry and Biostatistics
18. Core Course XIV - Research Methodology
19. Project and Viva-voce

4. Examination

The theory examination shall be of three hours duration to each paper at the end of each semester. The candidate failed in any subject will be permitted to appear for each failed subjects or subjects in the subsequent examination.

The examinations consist of Internal Assessment (I.A) and Semester Examination (S.E)

Internal Assessment marks for theory papers are as follows:

ATTENDANCE + ASSIGNMENT + SEMINAR + TEST						
5	5	5	10	=	25	

Internal Assessment marks for Practical Examination are as follows:

ATTENDANCE + OBSERVATION + TEST						
10	10	20		=	40	

Practical Examinations for PG course should be conducted at the end of even semester. Certified record of work done in the laboratory be submitted in the practical examination.

At the end of Fourth semester Viva-voce will be conducted on the basis of the Dissertation / project report submitted by the student. The Viva- voce will be conducted by one Internal and One External examiner jointly.

5. Scheme of Examinations

The Scheme of Examinations for different semesters shall be as follows:

Sl.No.	Title of the Paper	Duration	I.A.	S.E.	Total
Semester – I					
1.	Core Course I - Algae, Fungi, Lichens and Bryophytes	3 hrs	25	75	100
2.	Core Course II - Pteridophytes, Gymnosperms and Paleobotany	3 hrs	25	75	100
3.	Core Course III - Microbiology and Plant Pathology	3 hrs	25	75	100
4.	Elective Course I - Plant Resources Utilization and Conservation	3 hrs	25	75	100
5	Core Course IV - Practical I Extended Semester II	4 hrs	40	60	100
Semester – II					
6	Core Course VI - Anatomy, Embryology and Microtechniques	3 hrs	25	75	100
7	Core Course VII - Cell, Molecular Biology and Genetics	4 hrs	25	75	100
8	Core Course VIII - Environmental Biology	4 hrs	25	75	100
9	Core Course V - Practical II	4 hrs	40	60	100
10	Non-Major Elective - Human Rights - Paper I	3 hrs	25	75	100
Semester III					
11	Core Course IX- Taxonomy of Angiosperms	3 hrs	25	75	100
12	Core Course X - Plant Physiology and Biophysics	3 hrs	25	75	100
13	Elective Course Paper - II - Biotechnology and Bioinformatics	3 hrs	25	75	100
14	Non-Major Elective II - General Studies for Competitive Examination	3 hrs	25	75	100
15	Core Course XI - Practical III	3 hrs	40	60	100

Semester IV					
16	Core Course XIII - Biochemistry and Biostatistics	3 hrs	25	75	100
17	Core Course XIV - Research Methodology	3 hrs	25	75	100
18	Core Course XI - Practical IV	3 hrs	40	60	100
19	Project and Viva-voce	10	50	150	200

6. Question Paper Pattern for All PG Courses:

6.1. Time : 3 hrs marks

Maximum: 75

Part A (5X5= 25 marks)
(Answer ALL questions)
(One question from each Unit with internal choice)

Part B (5X10= 50 marks)
(One question from each Unit with internal choice)

6.2. Question paper pattern for practical Examination
(Pattern should be framed by concerned BOS)

6.3. Internal Assessment

6.3.1. For Attendance - 5 marks

75-80%	81-85%	86-90%	91-95%	96-100%
1 mark	2 marks	3 marks	4 marks	5 marks

6.3.2. For Assignment - 5 marks

6.3.3. For Test - 10 marks (Average of Test marks). Total 3 tests to be conducted per semester. Best of 2 tests average is taken into account.

6.3.4. For Seminar - 5 marks

7. Dissertation:

a) Topic : The topic of the dissertation shall be assigned to the candidate before the end of second semester and a copy of the same should be submitted to the Principal / Controller for approval.

Each guide shall have a maximum of five students in science and maximum for all Arts & Commerce subjects.

b) Plan of Work : The student should prepare a plan of work for the dissertation and get the approval of the guide. In case if the student wants to avail the facility from other University / laboratory, they will undertake the work with the permission of the guide and acknowledge the alien facilities utilized by them.

The duration of the dissertation / research shall be a minimum of three months in the fourth semester

c) **Dissertation work outside the College of study** : In case if the student stays away for work from the college for more than a month, specific approval of the college should be obtained.

d) **No. of copies / distribution of dissertation** : The students prepare three copies of dissertation and submit the same for the evaluation by examiners. After evaluation one copy is to be retained in the departmental library and one copy is to be submitted to the college and one copy can be held by the student.

e) **Format to be followed** : The format / certificate for dissertation to be submitted by the students are give below:

Format for the preparation of project work

1. Title Page
2. Bonafide certificate
3. Acknowledgement
4. Table of contents

Chapter No	Title	Page No
1.	Introduction	
2.	Review of Literature	
3.	Materials and Methods	
4.	Results	
5.	Discussion	
6.	Summary	
7.	References	

Format of the Title page:

TITLE OF THE DISSERTATION

Dissertation submitted in partial fulfillment of the requirement for the Degree of
Master of Science / Master of Arts in _____ Government Arts College
(Autonomous), Salem -7, affiliated to the Periyar university, Salem - 636 011.

By

Student Name :
Register Number :
Department :
Year :

8. Passing Minimum

For theory papers :

The breakup of marks shall be : 75 for written examinations (Semester External or S.E) and 25 for Internal Assessment (I.A). the passing minimum for all theory papers (semester external) shall be 38 out of 75. The break up of internal assessment marks for the theory papers will be as follows : **Seminar: 5 +Attendance : 5 + Assignment: 5 + Test: 10 = 25 Marks.** There is no passing minimum for internal assessment. **The passing minimum mark for all theory papers shall be 50 marks with both internal and external marks added together with a mandatory requirement that the candidate has secured not less than 38 out of 75 in the written (S.E) examination. Candidates who score less than 38 out of 75 in the theory papers and secure more than 50 with internal assessment (out of 100), have NOT secured the passing minimum and are required to reappear for those papers in the subsequent semesters.**

For the practical Examination

The practical Examinations for PG Courses will be conducted at the end of the even semester as II& IV semesters. The breakup of marks shall be **Practical Examination - 60 marks and Internal Assessment - 40 marks.** The breakup for internal assessment marks shall be practical class **Attendance -5 marks + Practical Tests - 10 marks + Field training programme - 25 marks.** There is no passing minimum for internal assessment for the practical. **The passing minimum mark for all practical papers shall be 50 marks with both internal and external marks added together under the mandatory requirement that the candidate has secured not less than 30 out of 60 in the written examination. Candidates who scored less than 30 out of 60 in the theory papers and secure more than**

50 with internal assessment (out of 100), have NOT secured the passing minimum and are required to reappear for those practicals in the subsequent year.

9 . Classification of successful candidates

The performance of the student is indicated by letter Grades and the corresponding Grade Point (GP), Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA).

Letter	Cumulative Grade Points Average	Grade Description	Range of Marks
S	10	Outstanding	90-100
A	9	Excellent	80-90
B	8	Very Good	70-79
C	7	Good	60-69
D	6	Average	50-59
E	5	Satisfactory	40-49
RA	0	Re-Appear	0-39

A student is deemed to have completed a course successfully and earned the appropriate credit, only if, the candidate earned a grade of E and above. RA denotes the candidates should Reappear the course again.

$$GP = (\text{Marks obtained in a course X credit}) / 10$$

$$GPA = \frac{\text{Total Grade points earned in a semester}}{\text{Total Credits registered in a semester}}$$

$$CGPA = \frac{\text{Sum of Grade Points earned}}{\text{Sum of credits registered}}$$

Classification

CGPA	9 and above	I Class with distinction
CGPA	Between 7 and 8.9	I Class
CGPA	Between 5 and 6.9	II Class

Note : The above classification shall be given for all performance including Non-Major Electives and Skill based Courses

10. Maximum duration for the completion of PG Programme:

The maximum duration for the completion of PG Programme shall not exceed 8 semesters.

11. Commencement of this regulation:

These regulation shall take effect from the academic year 2017-2018 (i.e.) for students who are to be admitted to the first year of the course during the academic year 2017-2018 and thereafter.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS)

SALEM -636007

M.Sc., BOTANY

Choice Based Credit System – Course Pattern

(For the students admitted from the year 2017-18 onwards)

Semester	Code	Study Components	Title of the Paper	Hrs/week	Credits	Marks		
						CIA	EA	TOTAL
I	17PBY01	Core Course I	Paper I : Algae, Fungi, Lichens and Bryophytes	5	5	25	75	100
	17PBY02	Core Course II	Paper II : Pteridophytes, Gymnosperms & Palaeobotany	5	5	25	75	100
	17PBY03	Core Course III	Paper III : Microbiology and Plant Pathology	5	5	25	75	100
	17PBYP1	Core Course IV	Practical I. Extended to II semester	6	-	-	-	-
	17PBYP2	Core Course V	Practical II. Extended to II semester	6	-	-	-	-
	17PBYM1	Elective Course I	Major Elective Paper I : Plant Resources Utilization and Conservation	3	4	25	75	100
II	17PBY04	Core Course VI	Paper IV : Anatomy, Embryology and Microtechniques	5	5	25	75	100
	17PBY05	Core Course VII	Paper V : Cell, Molecular Biology and Genetics	5	5	25	75	100
	17PBY06	Core Course VIII	Paper VI: Environmental Biology	5	5	25	75	100
	17PBYP1	Core Course IV	Practical I. Extended from I semester	6	4	40	60	100
	17PBYP2	Core Course V	Practical II. Extended from I semester	6	4	40	60	100
	17PGNMI	Non-Major Elective Course I	Non Major Elective Paper I: Human Rights	3	3	25	75	100
III	17PBY07	Core Course IX	Paper VII: Taxonomy of Angiosperms	5	5	25	75	100
	17PBY08	Core Course X	Paper VIII: Plant Physiology & Biophysics	5	5	25	75	100
	17PBYP3	Core Course XI	Practical III: Extended to IV semester	6	-	-	-	-
	17PBYP4	Core Course XII	Practical IV: Extended to IV semester	6	-	-	-	-
	17PBYM2	Elective Course II	Major Elective Paper II: Biotechnology and Bioinformatics	5	4	25	75	100
	17PGNM2	Non Major Elective II	General studies for Competitive Examinations	3	3	25	75	100

IV	17PBY09	Core Course XIII	Paper IX: Biochemistry and Biostatistics	6	5	25	75	100
	17PBY10	Core Course XIV	Paper X: Research Methodology	6	5	25	75	100
	17PBYP3	Core Course XI	Practical III: Extended from III semester	6	4	40	60	100
	17PBYP4	Core Course XII	Practical IV: Extended from IV semester	6	4	40	60	100
	17PBYPR	Project	Project and Viva Voce	6	10	50	150	200
	Total					90		

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-636007

(For the candidates admitted from 2017-18 onwards under CBCS pattern)

M.Sc.,Botany

Semester-IPAPER CODE : 17PBY01

PAPER-I ALGAE, FUNGI, LICHENS AND BRYOPHYTES

Objectives:

1. To understand the salient features of Algae, Fungi, Lichens and Bryophytes
2. To study the structure and reproduction of various genera mentioned in the syllabus

UNIT I :

ALGAE :- Introduction - Definition, classification of algae (F.E.FRITSCH and P.C.SILVA) criteria used in algal classification [pigmentation, reserve food, fine structure of eyespot and flagella] evolutionary trends in algae - Economic importance of Algae - fossil Algae.

UNIT II:

Occurance – thallus – organization - reproduction - life cycles of the following genera of Algae. Cyanophyceae – *Lyngbya*, Chlorophyceae – *Codium*, Charophyceae – Nitella, Xanthophyceae – *Botrydium*, Bacillariophyceae – *Cyclotella*, Phaeophyceae – Padina, Rhodophyceae – *Gracilaria*.

UNIT III :

FUNGI General characteristic of Fungi with reference to their occurrence and reproduction. Classification of Fungi by C.J. Alexopoulos and Mims (1998) – spore dispersal mechanism in Fungi – Mycorrhizae fungi.

UNIT IV :

Detailed study of the following genera of Fungi.

1. *Mastigomycotina*- *Phythium*, *Zygomycotina* -*Pilobolous*, *Ascomycotina* – *Taphrina*, *Basidiomycotina* - *Ustilago* and *Deuteromycotina* – *Cercospora*.

LICHENS :

General features, classification, distribution, thallus organization, reproduction and economic importance.

UNIT V : BRYOPHYTES :

General features , origin , range of vegetative structure , reproduction and classification of bryophytes. A detailed study of the following genera –

Marchantiales – Marchantia, Jungermaniales – *Porella*, Anthocerotales – *Anthoceros*, Sphagnales – Sphagnum, Funariales – Funaria and economic importance.

Practicals:

Study of Morphology and Anatomy of the vegetative and reproductive structure of the types mentioned in the syllabus. Certified record of work done in the laboratory to be submitted in the practical examination.

TEXT BOOKS :

ALGAE :

1. Fritsch F.E . The structure and reproduction of the Algae .vol .1 and 2 Vikas publications .New Delhi.
2. Pandey B.P 2001 College Botany volume 1 S.Chand& company Ltd New Delhi.
3. Sharman O.P 1989. Text book, Tata McGraw Hill of Algae publishing co- Ltd New Delhi .

FUNGI :

1. Sharman O.P 1989. Text book, Tata McGraw Hill of Aalgae publishing co- Ltd New Delhi .
2. Rajni Gupta 2004. A Text book of Fungi , A.P.H. Publishing corporation , New Delhi .

LICHENS :

1. Pandey, S.N. and Trivedi, P.S. A text book of Botany. 11th edition. Vikas Publishing House, New Delhi.
2. Sambamurthy, A.V.S.S. 2005. Text book of Algae. IK International, Publications, New Delhi.

BRYOPHYTES :

1. Reddy, S.M. 1996. University Botany.I: Algae, Bryophyta and Pteridophyta. New Age International Publishers, New Delhi.
2. Chopra.R.N. 1998. Biology of Bryophytes. New Age International Pvt. Ltd., New Delhi.

REFERENCE BOOKS

1. Smith G.M., 1986. Cryptogamic Botany - Algae and Fungi (I). Tata McGraw Hill Publishing Co. Ltd, New Delhi.
2. Smith G.M., 1989. Cryptogamic Botany - Bryophytes and Pteridophytes (II). Tata McGraw Hill Publishing Co. Ltd, New Delhi.
3. Vashishta B.R. and A.K.Sinha., 2005. Fungi. S.Chand& Co. Ltd, NewDelhi.
4. Vashishta B.R., 1991. Algae. S.Chand& Co, New Delhi.
5. Vashishta B.R., 2001. Bryophytes. S.Chand& Co, New Delhi.

MODEL QUESTION PAPER - THEORY

M.Sc, Degree Examinations

(For the candidates admitted from 2017-2018 onwards under CBCS pattern)

SEMESTER -1 - PAPER CODE : 17PBY01

PAPER –I: ALGAE, FUNGI, LICHENS AND BRYOPHYTES

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART - A(5x5 = 25)

Answer all the questions:

1. (a) Write a short note on the fine structure eyespot.
(or)
(b) Explain the structure of Flagella.
2. (a) Give a brief account on the nutrition in fungi.
(or)
(b) Describe the thallus structure in codium.
3. (a) Write a short note on the nutrition in fungi.
(or)
(b) Explain para sexuality in fungi.
4. (a) Explain the structure of spores in Ustilago.
(or)
(b) Describe the structure of conidia in Cercospora.
5. (a) Describe the internal structure of Reboulia.
(or)
(b) Describe the structure of capsule in Funaria.

PART B (5 X 10 = 50 marks)

Answer all the questions:

Draw diagrams wherever necessary.

6. (a) Outline the classification of Fritsch. List out the criteria used in the algal classification.
(or)
(b) Give an account of the ecology of Algae.
7. (a) Explain the structure and reproduction in Gracilaria.
(or)
(b) Explain the structure and life cycle in Nitella.
8. (a) Explain the different types of spore dispersal mechanisms in fungi.
(or)
(b) Write an essay on Heterothallism in fungi.
9. (a) Discuss the salient features of Hastigomycotina.
(or)
(b) Explain the structure and reproduction in Pilobolus.
10. (a) Enumerate the salient features of Jungermanniales.
(or)
(b) Give a general account of Lichens with reference to their structure and nutrition.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-636007

(For the candidates admitted from 2017-18 onwards under CBCS pattern)

M.Sc., Botany

SEMESTER -1 - PAPER CODE : 17PBY02

PAPER - II - PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY

Objectives :

1. To study the salient features of plants belonging to Pteridophytes and Gymnosperms.
2. To study the fossilization process and formation of different types of Fossils.

UNIT I : PTERIDOPHYTES

Introduction general features and origin of Pteridophytes – classification of Pteridophytes [REIMERS]-stelar evolution in Pteridophytes-apospory&apogamy-heterospory and seed habit – sporangial organization and evolution of sorus in fern in homosporous ferns – economic importance of Pteridophytes- gametophytes in pteridophytes –origin of Pteridophytes.

UNIT II :

Detailed study of the following range in structure , reproduction and evolution of gametophyte and sporophytes in Psilophytales – (Psilophyton), Psilotales – (*Psilotum*), Isoetales – (*Isoetes*), Ophioglossales –(*Ophioglossum*), Maratiales – (*Angiopteris*), Osmundales - (*Osmunda*), Filicales – (*Pteris*), Salviniiales – (*Salvinia*)

UNIT III : GYMNOSPERMS :-

Classification of Gymnosperms (K.R.SPORNE 1969) – General Characters , Distribution and phylogeny of Gymnosperms – economic importance of Gymnosperms – evolution of male and female gametophytes in Gymnosperms - woods of Gymnosperms.

UNIT IV :

Morphology ,Anatomy , reproduction and Phylogeny of

1. Cycadales –(*Cycas*), Coniferales – (*Araucaria*), Ginkgoales –(*Ginkgo*) and Gnetales – (*Gnetum*)

UNIT V : PALEOBOTANY : -

Geological time scale – Types of fossils – Methods of fossilization – A study of the following fossils of Pteridophytes and Gymnosperms – Objectives of Palaeobotany, Techniques to study fossils, *Sphenophyllum* , *Calamites*, *Lagenostroma* , *Cordites* ; *Pentoxylon* and *Williamsonia*.

PRACTICALS:

Study of Morphology and anatomy of the vegetative and reproductive structures of the types mentioned in the syllabus. Certified record of work done in laboratory to be submitted in the practical examination. Identification fossils included in the syllabus with suitable fossil slides.

TEXT BOOKS :

1. Vashista B.R.2001 Botany for degree students – Pteridophytes. S. Chand &CO.LTD 5th Edition.
2. Rashid A 1978. An introduction of Peridophytes. Vikas publishers.
3. Parihar N.S. 1959. An introduction of Peridophytes. Central Book Depot. Publishers.
4. Vashista P.C 1997. An introduction of Pteridophytes .Vikas publishing co .
5. Sambamurthy, A.V.S.S. 2005. A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany. I.K. International Publishing House. New Delhi.

REFERENCE BOOKS :

1. Sporne K.R. Morphology of Pteridophytes. B.I Publications, New Delhi.
2. Parihar, N.S 1967. An introduction to EmbryophytaPteridophyta. Vol. II Central Book Depot. Allahabad.
3. Rashid A. (1999). An introduction to Pteridophyta. Vikas Publishing Co., New Delhi.
4. Srivastava N. (1998) Gymnosperms. PradeepPublication, Jalandhar,
5. Arnold C.A.(1947) An introduction to Palaeobotany. McGraw Hill Book Co., New York.
6. Shuka, M.A. Sharma. M. (1992) Plant fossils. BirbalSahniInstitute of PalaeobotanyLucknow.

MODEL QUESTION PAPER - THEORY

M.Sc, Degree Examinations

(For the candidates admitted from 2017-2018 onwards under CBCS pattern)

SEMESTER -1 - PAPER CODE : 17PBY02

PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART - A(5x5 = 25)

Answer all the questions:

1. (a) Give the important features of the gametophytes of Pteridophytes.
(or)
(b) List out the salient features of the morphology of Pteridophytes.
2. (a) Write a short note on Psilophytales.
(or)
(b) What are the important features of Isoetales.
3. (a) Describe the structure of sorus in Angiopteris.
(or)
(b) Describe the internal structure of Equisetum stem.
4. (a) Explain the anatomy of the Podocarpus stem.
(or)
(b) Describe the structure of Cordaites Leaf.
5. (a) Write a short note on Cycadales.
(or)
(b) Explain the structure of stem in Cupressus.

PART B (5 X 10 = 50 marks)

Answer all the questions:

Draw diagrams wherever necessary.

6. (a) Give an account on the Reimer's classification of Pteridophytes.
(or)
(b) Write an essay on the evolution of sporophytes in Pteridophytes.
7. (a) Enumerate the salient features of the Ophioglossales.
(or)
(b) Give an account on Osmundales.
8. (a) Write an essay on Heterospory and seed habit.
(or)
(b) Explain the different methods of fossilization in Pteridophytes.
9. (a) Explain the evolution of female gametophytes in Gymnosperms.
(or)
(b) Give an account on the economic importance of Gymnosperms.
10. (a) Give an account on Pentoxylales.
(or)
(b) Write an essay on the evolution of coniferales.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM – 636007

(For the candidates admitted from 2017-18 onwards under CBCS pattern)

M.Sc., Botany

SEMESTER – I

PAPER CODE : 17PBY03

PAPER –III: MICROBIOLOGY AND PLANT PATHOLOGY

Objectives:

1. To study the salient features and classification of microbes and their importance.
2. To understand the microbial diseases in crop plants and its control measures.

Unit I

Definition of Microbiology, Classification of microorganisms – Bacteria & virus. Sterilization techniques. Culture media – types and preparation – pure culture and subculture methods. Decimal dilution technique. Microbiological stains and staining method – simple, differential and special stains.

Unit II

Types of soil microorganisms: Rhizosphere, Non- rhisosphere, Nitrogen fixers and Decomposers - Solid waste disposal, composting, recycling, biodegradation and bioremediation. Microorganism in air: Sources, types, air sampling techniques. Microbes in water: Microbial examination of water, waste water treatment and recycling.

Unit III

Food Microbiology: food spoilage, food poisoning, methods of food preservation. Dairy microbiology: Microbes of milk, milk products and milk pasteurization. Industrial microbiology: Alcoholic fermentation – process and recovery of products. Immobilization of microbes.

Unit IV

Bacteria: structure, organization, types of reproduction Transformation, Transduction and conjugation and mode of nutrition - Photosynthetic bacteria &Chemosynthtic bacteria, classification (Bergey's), and economic importance. Viruses: General properties, structure, symmetry- Envelopes andviral genome – plant viruses: types, double stranded DNA and RNA viruses. Bacteriophages, cyanophages, mycophages, viroids, interferons.

Unit V

Plant Pathology: definition, common terminology used in plant pathology. Pathogenesis – host pathogen interaction. Defensive mechanism in plants. Enzymes and mycotoxins in plant diseases – environmental factors in plant diseases – management of plant diseases – distribution, symptoms, disease management and epidemiology of the following plant diseases

1. Little leaf of Brinjal (Mycoplasma)
2. Bunchy top of Banana (Virus)
3. Bacterial blight of Paddy, Black arm of cotton.
4. Damping off of Seedlings by Pythium, Red rot of sugarcane.

Practicals

- I. Cleaning and sterilization methods (Laminar Air Flow Chamber, autoclave and Oven)
- II. Preparation of culture Media agar slant - agar plate.
- III. Isolation of microbes by streak and pour plate method.
- IV. Isolation of microbes by soil dilution techniques.
- V. Isolation of Bacteria and Fungi from spoiled food.
- VI. Gram staining of Bacteria.
- VII. Simple staining of bacteria (Methylene blue/crystal violet)
- VIII. MBRT of milk (Phosphatase test)
- IX. Plant Pathology - Plant disease mentioned in theory syllabus.

References

1. Alexander, 1978, Introduction to Soil Microbiology, Wiley Eastern.
2. Aneja, Microbiology and Plant Pathology.
3. Artjar Knight, Molecular Virology.
4. Atlas R.M. 1988. Microbiology - Fundamentals and Applications.
5. Dargis, J. 1975. Bacteriophages. Chapman and Hall.
6. Freifelder. D. 1987. Microbial Genetics, Indian Edn. Narora Publishing House.
7. Ketchum, Paul, A. 1988. Microbiology - Concepts and Application, John Wiley and Sons.
8. Mandhakar, C.L. 1978. An Introduction to Plant Virus, S.ChandCo.

9. Microbes in action. A Laboratory Manual of Microbiology, W.H. Freeman & Co., New Delhi
10. Pelezar Jr.M.J., E.C. S.Chand and Krieg N.R. 1986. Microbiology 5th Edition.
11. R.S.Mehrotra&AshokaAgarwal,2003.Plant Pathology.Tata McGraw Hill Publication.
12. Purohit, 1990. Microbiology, Agrobotanical Publishers.
13. Rangasami, G. 1972. Diseases of Crop Plants in India, Prentice Hall India (Private) Ltd., New Delhi.
14. Smith, K.M. Viruses, Cambridge University Press, London.
15. SubbaRao, N.S. 1977. Soil Microorganisms and Plant Growth. Oxford and IBH Publishing Co Pvt. Ltd., New Delhi.
16. Sambamurthy A.V.S.S. and Subramayam, N.S. 1989. A Text book of Economic.
17. Botany, Wiley Eastern Limited, Daryaganj, New Delhi.
18. Shani K.C. 2000. The book of Indian Trees, Oxford University Press, Mumbai.
19. Sharma O.P. 1996. Hill's Economic Botany, Tata McGraw Hill Co. Ltd., New Delhi.
20. Trivedi P.C. 2005. Biodiversity assessment and conservation, Agrobios. Jodhapur.
21. Youngken, Natural Drugs: Morphological and Taxonomic Consideration. TirumalaiBook House, Triplicane, Chennai.

MODEL QUESTION PAPER - THEORY
M.Sc., Degree Examinations
(For the candidates admitted from 2017-2018 onwards under CBCS pattern)
SEMESTER -1 - PAPER CODE : 17PBY03
PAPER-III: MICROBIOLOGY AND PLANT PATHOLOGY

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART- A(5x5 = 25)

Answer all the questions:

1. (a) Write short notes on Gram's staining.
(or)
(b) Write short notes on nitrogen fixing organisms.
2. (a) Give an account on pasteurization.
(or)
(b) Give a brief account on Biopesticides.
3. (a) Write short notes on Soil bacteria.
(or)
(b) Give an account on Nitrogen fixing organisms.
4. (a) Write short notes on chemotrophic bacteria.
(or)
(b) Give a brief account on Food spoilage by bacteria.
5. (a) Write short notes on Bacteria Blight of paddy.
(or)
(b) Give a brief account of mycotoxins.

PART B (5 X 10 = 50 marks)

Answer all the questions:

Draw diagrams wherever necessary.

6. (a) Describe the types and preparation of various culture media.
(or)
(b) Explain the various sterilization techniques.
7. (a) List out the microbes present in the air. Explain the different techniques employed in airsampling.
(or)
(b) Give an account on waste water treatment and recycling.
8. (a) Write an account on Microbes in water.
(or)
(b) Discuss the role of Bacteria in Dairy Industry.
9. (a) Give a detailed account of Bergey's classification of bacteria.
(or)
(b) Write a brief account on
i) Cyanophages ii) Mycopages iii) Interferon
10. (a) Write an essay on the occurrence, casual organism symptoms, disease management of little leaf of bringal.
(or)
(b) Explain the interaction between the host and pathogen.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-636007

(For the candidates admitted from 2017 – 2018 onwards under CBCS pattern)

M.Sc. BOTANY

SEMESTER –I

ELECTIVE COURSE –I : 17PBYM1

PLANT RESOURCES UTILIZATION AND CONSERVATION

Objectives

1. To understand the plant biodiversity and its utilization for the human welfare.
2. To learn the conservation of plant resources.

Unit – I

Plant biodiversity – Biodiversity at global level – Biodiversity at country level – Species diversity and Ecosystem stability. Loss of biodiversity – Introduction – Listing of threatened biodiversity – Causes – Useful aspects of lower plants, Algae, Fungi and Lichens.

Unit – II

Binomial, cultivation and uses of food crops, cereals (Rice, Pennisetum), pulses (gram, soyabean), vegetables (carrot, cabbage), fodder crops (natural grass cultivated fodder), oil cakes, poultry feeds. Fibre and fibre plants, nature of fibre, classification of fibre, binomial and uses of cotton, jute.

Unit – III

Medicinal plants: classification of drugs, drugs from various parts of plants – chemical constituents – alkaloids – therapeutic uses. Binomial cultivation, medicinal properties and uses of: *Ashwagandha*, *Dioscorea*, *Aloe*, *Coleus*, *Azadirachta*, *Rauvolfia*, *Piper*, *Curcuma*, *Phyllanthus*, *Emblica*, *Trigonella foenum-graceum*.

Unit – IV

Vegetable oil yielding plants: classification of vegetable oils – chemical constituents, nature of vegetable oils. Binomial classification, uses of corn oil, sunflower oil, vegetable fat *Cocos nucifera*.

Forest resources: Wood – its importance and structure – types, properties and uses. A brief account of bio-diesel plants. Paper industry – raw materials, manufacturing process. Gums, tannins, dyes, resin yielding plants and uses.

Unit – V

Strategies for Conservation:

In-situ Conservation: International efforts and Indian initiatives: Protected area in India – Sanctuaries, National parks, Biosphere reserves, Wet lands, Mangroves and Coral reefs for conservation of wild biodiversity.

Ex-situ Conservation: Principles and practices; Botanical gardens, field gene banks, in-vitro repositories, cryobanks. General account of the activities of National Bureau of Plant Genetic Resources (NBPGR), Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR) and the Department of Biotechnology (DBT) for conservation, non-formal conservation and efforts.

References

1. Agarwal, 1985. Drug plants in India. Kalyani Publishers, Ludhiana.
2. Agrobios (India). A hand book of medicinal plants – A complete source.
3. Agrobios (India). Biodiesel and *Jatropha* cultivation. Agrobios, Jodhpur.
4. Anonymous (1980). Forest research institute, Indian forest utilization, Vols. I & II. The manager of publications, Government of India Press, New Delhi.
5. Bhat, Chemistry of natural products, tamilnadu Book House, triplicane, Chennai.
6. Brown A. Edithi. Vegetable oils. A & C Black Ltd., London.
7. Council of Scientific and Industrial Research, 1986. The useful plants of India.
8. Frankel D.H. & Benneth, E. 1970. Genetic resources in plants – The Exploitation and
9. Gupta, P.K. 1996. Transgenic plants. Some current issues. Current Sci. 70.
10. Henry, The plants Alkaloids, Tirumalai Book House, Triplicane, Chennai.
11. Jayamaran, J. 1981. Laboratory manual in biochemistry. Wiley Eastern Ltd., New Delhi.
12. Kumar, U. 2004. Biodiversity: Principles and Conservation, Agrobios, Jodhpur.
13. Publications and Information Directorate, CSIR, New Delhi.
14. Resources (booklet), National Bureau of Plant Genetic Resources, New Delhi.
15. Sadhasivam, S. & Manikam, A. Biochemical methods. New Age International, New Delhi.

MODEL QUESTION PAPER – THEORY

**M.SC., Degree Examinations
(For the candidates admitted from 2017-18 onwards Under CBCS Pattern)
SEMESTER – I
ELECTIVE COURSE – I : 17PBMY1
PLANT RESOURCES UTILIZATION AND CONSERVATION**

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A (5 X 5 = 25)

Answer all the questions:

1. (a) Give an account of biodiversity at global level.
(or)
(b) Write about the role of plant introduction in the view of merit and demerit.
2. (a) Give an account on fodder crops.
(or)
(b) Write about the chemistry of fibres.
3. (a) Give a general nature of alkaloids derived from medicinal plants.
(or)
(b) Write about phyllanthes in medicinal aspect.
4. (a) Give a brief account of plants and role of bio-diesel.
(or)
(b) List out some resin yielding plants and their uses.
5. (a) Write about the general activities of NBPGR.
(or)
(b) Write about the role of ICAR.

PART B (5 X 10 = 50 marks)

Answer all the questions:

Draw diagrams wherever necessary.

6. (a) Write about the useful products derived from Fungi used in various industries.
(or)
(b) Write about the uses of lichens in ecological, medicinal and food aspects.
7. (a) Give an account of underground vegetables.
(or)
(b) Write about the binomial, cultivation and uses of leafy vegetables.
8. (a) Write about the botanical description, cultivation and medicinal properties of Dioscorea and Aloe.
(or)
(b) Give an account of insecticide and bioinsecticides.
9. (a) Give a detailed account of the structure, types, chemical composition, properties and uses of wood.
(or)
(b) Write about the classification and chemical constituents of vegetable oils and give binomial and uses of corn 'oil'.
10. (a) Write about 'in-situ' conservation in detail.
(or)
(b) Write about 'ex-situ' conservation in detail.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-636007

M.Sc., Botany

Choice Based Credit System

(For the candidates admitted from 2017-18 Onwards)

SEMESTER -II - PAPER CODE : 17PBY04

ANATOMY, EMBRYOLOGY AND MICROTÉCHNIQUES

Objectives:

1. To attain knowledge about various aspects of anatomical features of plants.
2. To understand the key aspects of embryology of Angiosperms

Unit - I :

Tissue and Tissue Systems- Secondary xylem- structure-Distinction from primary xylem- vertical and horizontal system-storied and non-storied woods. Growth layers-sap wood and heart wood. Arrangement of vessels in secondary xylem of dicots- secondary phloem- structure and functions- Dendrochronology- compression wood and tension wood- phylogenetic trends of specialization of xylem and phloem- Nodal types and evolution.

Unit - II :

Vascular cambium- origin- types- structure and Etiology. Division of fusiform and ray initials. Seasonal activity- part played by cambium in wound healing. Anomalous secondary thickening in dicot stems: *Bignonia*, *Amaranthus*, *Boerhaavia*, *Aristolochia* and Arborescent monocots. Leaf ontogeny- transfer cells.

Unit -III:

Embryology – Structure and development of anther. Microsporogenesis; Ultrastructure of pollen wall; Pollen–stigma incompatibility, methods to overcome incompatibility, structure, development and types of ovules, megasporogenesis and female gametophyte (*Polygonum* type of embryosac development), Nutrition to Embryo sac.

Unit -IV

Fertilization and its control, Endosperm – Nuclear, cellular and helobial and Ruminant types. Development of embryo – dicot and Monocot. Embryology in relation to taxonomy. Apomixis, Polyembryony and Parthenocarpy.

Unit -V

Microtechnique: A broad outline on steps involved in microtome sectioning (Fixation, dehydration, clearing, infiltration, embedding and block making), staining techniques, Types of Microtome, Camera lucida- Principle and their uses, Micrometry and Photomicrography.

Practicals

Study of suitable specimens to understand the anatomy of the plants mentioned in the syllabus. Dissecting the shoot and root apices. Embryo development stages to be dissected out, Knowledge and working of microtomes. Measurement of macerated elements by micrometry. Demonstration of Paraffin microtome section cutting and staining.

References

ANATOMY

1. Bailey IW., (1954). Contributions to Plant Anatomy.
2. Carquest S. 1961. Comparative Plant Anatomy Richard.
3. Cutter, E.G. (1978). *Plant Anatomy Part-I: Cells and Tissues* (2nd Edn.), *Plant Anatomy: Experiments and Interpretations*. Edward Arnold, London.
4. Cuter., EG. 1978. Plant Anatomy: Edward Arnold Pub. Ltd., London.
5. Esau, K. (1977). Anatomy of Seed Plants. Wiley Eastern Publications.
6. Fahn, A. (1989). *Plant Anatomy*. Mac Millan Publication. Singapore (P) Ltd.,
7. Pandey B.P. (1978). Plant Anatomy S. Chand & Co. Ltd., New Delhi.

EMBRYOLOGY

1. Bhojwani, S.S. and Bhatnagar, S.P. (2000). *The Embryology of Angiosperms* (4th Edition). Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
2. Johri, B.M. (1982). *Experimental Embryology of Vascular Plants*. Springer –Verlag, Heidelberg.
3. Maheswari, P. (1985). *An Introduction to the Embryology of Angiosperms*. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Maheswari, P. (1963). *Recent Advances in the Embryology of Angiosperms*. International Society of Plant Morphologists, University of Delhi.
5. Rogland, A. (2000). *Developmental Botany (Embryology of Angiosperms)*. Saras Publications, Nagercoil.

MICROTECHNIQUES

1. Johanson D.A. 1940. Plant Microtechnique. Mac - Graw Hill, New Delhi.
2. Purvis M.J.et al 1966. Laboratory Techniques in Botany, Butter Worths, London.
3. Sas. Joe E. 1964. Botanical Microtechnique Oxford and IBH.

MODEL QUESTION PAPER – THEORY

M.Sc., Degree Examinations
(For the candidates admitted from 2017-18 onwards Under CBCS Pattern)
Choice Based Credit System
Paper Code : (17PBY04)
ANATOMY, EMBRYOLOGY AND MICROTÉCHNIQUES

Time: 3 Hrs Maximum: 75

Part A (5x5=25)

Answer All the questions

Draw diagrams wherever necessary

Each answer should not exceed 100 Words

1. a. What is a secondary xylem? Explain the structure of secondary xylem.
(OR)
- b. Briefly explain Growth layers.
2. a. Write short notes on vascular cambium and its origin.
(OR)
- b. Explain the anomalous secondary growth in Bignonia.
3. a. Define Incompatibility. Explain the methods to overcome incompatibility.
(OR)
- b. What do you mean by megasporogenesis? Explain.
4. a. Write a note on polyembryony.
(OR)
- b. Describe the process of fertilization.
5. a. Explain the importance of photomicrography in sectioning.
(OR)
- b. What do you mean by embedding? Explain its process.

Part B (5x10=50)

Answer All the questions

Draw diagrams wherever necessary

Each answer should not exceed 1000 Words

6. a. Differentiate between compression wood and tension wood.
(OR)
- b. Describe the types of nodes and its evolution.
7. a. Explain the anomalous secondary structures in dicots.
(OR)
- b. Bring out the salient features of arborescent monocots.
8. a. Describe the structure of matured anther.
(OR)
- b. Discuss about the Polygonum type of embryo sac.
9. a. Explain on types of endosperm.
(OR)
- b. Write an account on development of monocot embryo.
- 10 a. Outline the various processes involved in microtome sectioning.
(OR)
- b. Explain the principles and uses of Camera lucida.

GOVERNMENT ARTS COLLEGE (AUOTNOMOUS), SALEM - 636007

M.Sc., BOTANY

(For the candidates admitted from 2017-18 onwards Under CBCS Pattern)

PAPER CODE – 17PBY05

CELL, MOLECULAR BIOLOGY AND GENETICS

OBJECTIVES

1. To study the progress made in the field of cell, cell organelles and their functions
2. To understand the principle, the hereditary mechanism at molecular level , the structure and functions of genetic materials

UNIT I

Origin and development of Cell Biology as a separate branch. Structure and organization of prokaryotic and eukaryotic cells. Plasma Membrane – Molecular structure, chemical structure and functions. Cell wall – Primary, secondary and tertiary at submicroscopic and molecular levels. Chemistry of cell wall – polysaccharides, lignin, chitin, suberin , cutin and wax. Detailed study of cytoplasmic organelles (Morphology, Ultra structure, chemical composition, origin and function) Mitochondria, Plastids, Ribosome, Dictyosome, Lysosome, Sphaerosome, Glyoxisome and Peroxisome, Endoplasmic reticulum

UNIT II

Structure and functions of Nucleus, Nuclear envelope and Nucleus. Chromosomes – general account, detailed morphology and ultra structural organization. Special types of Chromosomes – cell cycle (brief account only). Cell divisions: Mitosis – Mitotic apparatus and its physicochemical characteristics and biochemical composition. Meiosis – process of meiosis in detail, theories on crossing over and chiasma formation and their significance

UNIT III

Macromolecules – major classes, proteins, nucleic acids, and polysaccharides (detailed structure not necessary). Nucleic acid – physical and chemical structure of DNA, Types of DNA, Watson & Crick model of DNA, viral DNA, bacterial DNA, Mitochondrial and Chloroplast DNA. DNA as genetic material, DNA synthesis and replication, semi-conservative, dis-continuous replication, biochemical replication, termination of replication, Enzymes of DNA replication – Methylation of DNA and mismatch repair , C-value paradox- A,B,C and Z forms of DNA. Synthesis of RNA – different types of RNA, DNA dependent RNA and Polymerase, Initiation of transcription, post transcriptional changes in RNA . Genetic code.

UNIT IV

Mendel's Law of inheritance – interaction of genes, quantitative inheritance. Sex determination in plants, theories of sex determination. Sex linked characters – primary, secondary and permanent, non-disjunction of Sex chromosomes in *Drosophila*. Chromosome theory of inheritance. Gene mutation – detection of mutation CLB method, Muller 5 method, Biochemical mutants in Bacteria and *Neurospora*. Detection of mutation in Bacteriophages and higher plants. Molecular basis of mutation, physical and chemical mutagens and their mode of action

UNIT V

Multiple alleles and pseudo alleles. Modern concept of genes. Fine structure of the gene – IS element – transposons. Extrachromosomal inheritance, genome of mitochondria and plastids and their role in inheritance. Uniparental inheritance in *Chlamydomonas* and *Paramecium* – Male sterility. Population genetics – gene frequencies, mutation selection, migration, genetic drift, genetic disorder of chromosomal and genetic origin. Regulation of gene expression in Eukaryotes and Prokaryotes

Practicals

Study of the structure of plant cell organelles and giant chromosomes from electron micrographs in standard publications. Study of mitosis by squash and Meiosis by smear techniques. Solving genetic problems - Interaction of factors and three point test cross.

Reference Books

1. Prescott D.M. 1988. Cells – Principles of molecular structure and functions, Jones and Barlett Publishers, Boston U.S.A
2. De Robertis E.D.P & De Robertis E.M.F., 1980 – Cell and Molecular Biology, Holt Saunders International Editions, Philadelphia
3. Gerald Karp 1999 Cell and Molecular Biology- Concept and Expts. John Wiley and Sons Inc., USA.
4. Cooper G.M and Hausman R.E 2007 (Fourth Edition). The Cell molecular approach Sinauer associate, Inc, Sunderland (USA).
5. Powar C.B 2005 (Third Edition). Cell Biology, Himalaya Publishing, Mumbai.
6. Brown T. A., 1999. Genomics. John Wiley & sons Inc New York
7. Strickberger M. W. 1976. Genetics, Mac Millan Publishing Co. Inc., New York
8. Gardner E.J. Simmons M.J. and Snustad D.P. 1996 Principles of Genetics, John Wiley & sons Inc New York
9. Lewin B. 1998 Genes VI, Oxford University press
10. Miglani G.S. 2002 Advanced Genetics, Narosa publishing house
11. Friefelder D. 1985. Molecular Biology, Jones and Barlett Publishers, Boston U.S.A
12. Singh, E.D. 1990. Plant Breeding. Kalyani Publishers, New Delhi.
13. Allard, R.W. 1960. Principles of Plant Breeding, John Wiley and Sons, Inc. New York.
14. Peter J Russel 1994. Fundamentals of Genetics, HarperCollins college Publishers, UK

MODEL QUESTION PAPER – THEORY

M.Sc., Degree Examinations
(For the candidates admitted from 2017-18 onwards Under CBCS Pattern)

SEMESTER – I

PAPER CODE : 17PBY05

CELL, MOLECULAR BIOLOGY AND GENETICS

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A (5 X 5 = 25)

Answer all the questions:

- (a) Write short notes on prokaryotic and eukaryotic cell.
(or)
(b) Give a brief account on RNA editing.
- (a) Write notes on golgi apparatus.
(or)
(b) Write short notes on the role of vacuole in plant cells.
- (a) Give a brief account on lampbrush chromosomes.
(or)
(b) Write short notes on the role of spindle fiber.
- (a) Explain post transcriptional modification.
(or)
(b) Give a brief account on RNA polymerase.
- (a) Write short notes on cis-trans test.
(or)
(b) What is attenuation.

PART B (5 X 10 = 50 marks)

Answer all the questions:

Draw diagrams wherever necessary.

- (a) Write an essay on the structure, models and functions of plasmamembrane.
(or)
(b) Give an account on structure, genome organization and function of Mitochondria.
- (a) Describe the structure and types of ribosomes. Point out their role in protein synthesis.
(or)
(b) Write an essay on DNA structure, types and replication.
- (a) What are the different types of chromosomal aberration you have studied.
(or)
(b) Give an account on allopolyploidy and its role in speciation.
- (a) Explain different types of mutations.
(or)
(b) Describe Hardy-Weinberg principle and its application.
- (a) Briefly explain the regulation of gene expression in Prokaryotes.
(or)
(b) Explain how environment regulates the gene expression.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM - 636 007

(For the candidates admitted from 2017-18 onwards Under CBCS Pattern)

M.Sc, Botany

SEMESTER-II- PAPER CODE : 17PBY06

ENVIRONMENTAL BIOLOGY

Objectives

1. To learn the underlying principles of plant environment and Ecosystem
2. To study the various types of vegetations and its distribution

Unit I

Ecosystem - concept - structure and function - producers, consumers and decomposers - energy flow - food chain, food web and ecological pyramids - types of ecosystem - characteristic features, structure and function of Grassland, Forest, Desert and Aquatic (lake, river, oceans), ecosystems.

Unit II

Ecological succession - organismic and individualistic views of succession - succession mechanisms - process of succession - hydrosere - Xerosere and lithosere - climax concept in, succession-theories of climax concept.

Unit III

Populations ecology and population growth - community - Biotic community concept - Groups of community - classification of communities - origin and development of communities - composition, structure, theories and characteristic of communities.

Unit IV

Environmental pollution - Air pollution - definition, causes - carbon monoxide, dioxides, acid rain, ozone, hydrocarbon- effect and control - Water pollution - signs of polluted water - classification of foreign substances in water - BOD and COD -Eutropication - sewage disposal treatment - prevention and control.

Unit V

Soil Pollution, Noise pollution - sources - physical properties and measurement of sound - reasons of noise pollution - effects - natural disasters - flood, earthquake, cyclone, Tsunami, landslides their effects and management.

PRACTICALS

1. Estimation of soil moisture and humus contents.
2. Determination of soil pH.
3. Quadrat method of studying frequency, density and abundance of species .
4. Determination of minimum size of quadrats by species area curve method.
5. Estimation of dissolved oxygen by winklers method.
6. Estimation of dissolved CO₂.

References

1. Bhaskaran, T.R. 1989. Environmental pollutions. Journal IAEM, Vol. 16, 1-15.
2. Bishop P.L. 2000. Pollution prevention, fundamentals and practice. McGraw Hill Series, New York.
3. Bodkin Keller. 2000. Environmental Science. John Wiley & Sons, New York.
4. Canter L.W.1996. Environmental impact assessment. McGraw Hill International Edition, New York.
5. DuncanMaraandNigelHoron.TheHandbooklofWaterandWastewater microbiology. Academic Press, London.
6. EckenfelderJr.W.W.1999.Industrialwaterpollutioncontrol.McGrawHill International edition. New York.
7. Gayle Woodside, 1999. Hazardous materials and Hazardous waste management. John Wiley and Sons, New York.
8. Jorgensen S.E. and Johnson, I. Principles of Environmental Science and Technology. Elsevier Publications, Tokyo.
9. Kumar, H.D. 1997. Modern concepts of Ecology. Vikas Publishing House Pvt. Ltd., New Delhi.
10. Liu, D.H.F. and Liptake, B.G. 2000. Air pollution. Lewis Publishers, Washington.
11. Liu, D.H.F, and Liptake, B.G. 2000.Hazardous waste and Solid waste.Lewis Publishers, Washington.
12. Nemerow V.L. 1963. Theories and Practice of Industrial Waste Treatment. Addison - Wesley M.A. New Delhi.
13. Odum E.P. 1996. Fundamentals of Ecology, Nataraj Publishers.
14. Ostler, N.K. 1996. Introduction to Environmental technology. Prentice Hall, Inc New Jersey.
15. Pitman. 1980. Environmental Studies. Pitman Educational Ltd, London.
16. Selka, S.E.M. 1990. Packing and Environmental technomic publishing co, USA.
17. Sharma P.D. 1999. Ecology and Environment. Rastogi Publications, Meerut.
18. US Environmental Protection Agency, 1989. Glossary of Environmental terms and Acronym list, Washington, D.C.

MODEL QUESTION PAPER- THEORY

M.Sc, Degree Examinations

(For the candidates admitted from 2017-2018 onwards under CBCS pattern)

SEMESTER-II - PAPER CODE : 17PBY06

ENVIRONMENTAL BIOLOGY

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A(5X5 = 25)

Answer all the questions:

1. (a) Discuss the decomposers.
(or)
(b) Explain the ecological pyramids.
2. (a) Define ecological succession.
(or)
(b) Explain climax concept in succession.
3. (a) Discuss community.
(or)
(b) Explain population ecology.
4. (a) Write note on BOD.
(or)
(b) Write notes on ozone.
5. (a) Explain Cyclone.
(or)
(b) Give an account on flood.

PART B (5 X 10 = 50 marks)

Answer all the questions:

Draw diagrams wherever necessary.

6. (a) Write an essay on forest ecosystem.
(or)
(b) Explain aquatic ecosystem.
7. (a) Give an account on Xerosere.
(or)
(b) Write an essay on hydrosere.
8. (a) Write an essay on biotic community concept.
(or)
(b) Explain population growth.
9. (a) Write an essay on Air Pollution.
(or)
(b) Give an account on Water Pollution.
10. (a) Write an essay on Noise pollution.
(or)
(b) Explain Soil pollution.

GOVERNMENT ARTS COLLEGE, (AUTONOMOUS) SALEM- 636 007

For the candidates admitted from 2017-18 onwards Under CBCS Pattern

SEMESTER-II - PAPER CODE : 17PGNM1

HUMAN RIGHTS

Unit I

Human Rights - definition - Classification of rights - Universal declaration of Human rights - International Covenants on economic and social rights - Indian Constitutional provision for Human Rights - Fundamental Rights.

Unit II

Civil and Political Rights - Right to work, right to personal freedom - right to freedom of expression - right to property - right to education - right to religion - right to form associations and unions - right to movement - right to family - right to constitutional remedies - right to vote and contest in elections - right to hold public offices - right to petition - right to information - right to criticize the Government - right to democratic governance.

Unit III

Economic Rights - right to work - right to adequate wages - right to reasonable hours to work - right to fair working conditions - right to self government in industry - customer right.

Unit IV

Women Rights - right to inheritance - right to marriage - divorce and remarriage - right to adoption - right to education - right to employment - rights relating to dowry - rights for equality - right to safe working condition.

Unit V

Violation of Human Rights - By state and individuals - Rights of refugees - Minorities - Dalits - Tribes - Nomads - Prisoners - National Commission and State Commissions for Human Rights - Role of Judiciary - Media and Police in the Protection of Human Rights.

References:

1. Krishna Iyer, Human Rights and Human Wrongs, B.R. Publication Corporation, Delhi, 1990.
2. Palkhiwala Nani. A, We the Nation, The Lost Decadees, UBSPD, New Delhi, 1994.
3. Human Rights - A Source book, NCERT, 1999.
4. Srivastava, Human Rights: Issues and Implementation, Rings Indian Publication, Delhi, 2004.
5. Pachuri, S.A. Women and Human Rights, Asia Law Agency, Allahabad. 2000.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM – 636 007

For the candidates admitted from 2017-18 onwards under CBCS Pattern

SEMESTER – III

PAPER VII – PAPER CODE : 17PBY07

TAXONOMY OF ANGIOSPERMS

Objectives: To acquire the fundamental values of plant systematics; to know about the basic concepts and principles of plant systematics; to establish a suitable method for correct identification and adequate characterization of plants; to be aware of the importance of taxonomic relationships in plant systematic studies.

UNIT – I

Taxonomy and systematics– Basic components and goals of systematics; Advancement levels in systematics and systematics in internet revolution. Historical background of plant classification: Classification based on gross morphology, sexual system (Carlos Linnaeus), natural system and phylogenetic system (transitional systems, intentional and contemporary). Major systems of classification: Bentham & Hooker, Engler&Prantl, John Hutchinson. Angiosperm Phylogeny Group (APG) – Outline of APG-III plant classification.

UNIT – II

Botanical nomenclature: Need for scientific names, history of botanical nomenclature, principles of ICBN, the type method, author citation, publication of names, principles of priority, names of hybrids, names of cultivated plants and draft biocode. Botanical Survey of India (BSI) – Organization, function and contribution. Process of Identification: Specimen preparation, herbarium methods, and identification methods (taxonomic literature, taxonomic keys and computers in identification); Botanical library; Botanical gardens. Hierarchical classification: taxonomic groups, categories and ranks, utilization of categories (speciesconcept, intraspecific ranks, genus and family).

UNIT – III

Phylogeny of Angiosperms: Important phylogenetic terms and concepts; origin and evolution of angiosperms; Taxonomic evidence: Morphology, anatomy, embryology, chromosomal, chemotaxonomy and serotaxonomy. Phenetic and phylogenetic methods: Phenetic- numerical taxonomy, phylogenetic – cladistics. Variation and speciation.

UNIT – IV

Study of the diagnostic characters, economic importance, systematics and phylogeny of Ranunculaceae, Menispermaceae, Papaveraceae, Brassicaceae, Violaceae, Polygalaceae, Portulacaceae, Sterculiaceae, Meliaceae, Oxalidaceae, Rhamnaceae, Vitaceae, Sapindaceae, Anacardiaceae, Combretaceae, Passifloraceae.

UNIT – V

Study of the diagnostic characters, economic importance, systematics and phylogeny of: Lythraceae, Sapotaceae, Boraginaceae, Convolvulaceae, Acanthaceae, Bignoniaceae, Amaranthaceae, Chenopodiaceae, Aristolochiaceae, Loranthaceae, Casuarinaceae, Commelinaceae, Arecaceae, Typhaceae, Araceae, Cyperaceae.

PRACTICALS

Taxonomy

Identification of specimens belonging to the families included in theory syllabus at family, generic and specific levels. Economic importance of the plant/plant parts from the families in theory. Familiarity with the use of floras. Preparation of dichotomous artificial keys using locally available plants. A field trip of not less than a week to a place of luxuriant vegetation within or outside the state to study the flora. Submission of a tour report and 25 herbarium sheets during practical examination.

References

1. Bensen, L.D. 1957. Plant Classification. Oxford & IBH Publishing Co., New Delhi.
2. Bentham, G. 1988. Hand Book of British Flora. (7th ed., revised by Rendle A.B. in 1930). Ashford, Kent.
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5. Davis, P.H. and Heywood, V.M. 1963. Principles of Angiosperm Taxonomy. Oliver & Boyd, London.
6. Gamble, J.S. and L.E.F. Fisher 1967. The Flora of the Presidency of Madras vol - I, II, III, BSI, Calcutta.

7. Henry, A.N. and Bose, C. 1980. An aid to the International Code of Botanical Nomenclature, Today & Tomorrow's Printers & Publishers, New Delhi.
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13. Rendle, A.B. 1904. Classification of Flowering plants (2nd ed. Vol.1), Cambridge University Press, England.
14. Santapau, H and H.D. Henry 1994. A Dictionary of Flowering plants of India C.S.N. New Delhi.
15. Sharma, O.P. 1958. Plant Taxonomy. Tata McGraw Hill Publishing Company Ltd., New Delhi.
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18. Street, H.E. 1978. Essay in Plant Taxonomy, Academic press, London.
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M. Sc., Degree Examinations
MODEL QUESTION PAPER – THEORY
PAPER VII – PAPER CODE : 17PBY07 / TAXONOMY OF ANGIOSPERMS
TIME: 3 Hrs **Maximum: 75 Marks**

PART – A (5x5=25)

Answer All the Questions.

1. (a) Explain natural system of classification.
(or)
(b) Discuss the outline of APG-III classification.
2. (a) What are the rules for construction of keys.
(or)
(b) Give an account on international herbaria.
3. (a) Briefly outline the role of floral anatomy in taxonomic studies.
(or)
(b) What are the basic concepts of variation and speciation?
4. (a) Give an account on the salient features of Anacardiaceae.
(or)
(b) Discuss briefly on the floral characteristics of Menispermaceae.
5. (a) Bring out the characteristic features of Combretaceae.
(or)
(b) Write notes on the inflorescence of Araceae.

PART – B (5x10=50)

Answer All the Questions.

6. (a) Give an account on Engler&Prantl's classification.
(or)
(b) Discuss the historical background of plant classification.
7. (a) Bring out the organization, function and contributions of BSI.
(or)
(b) Write an essay on the history of botanical nomenclature.
8. (a) Explain numerical taxonomy and its role in Angiosperm classification.
(or)
(b) Write an essay on the origin and evolution of Angiosperms.
9. (a) Give an account on the characteristics and economic importance of the family Brassicaceae.
(or)
(b) Discuss the systematics and phylogeny of Ranunculaceae.
10. (a) Explain the features of the families in the Order Polymoniales you have studied.
(or)
(b) Write an essay on the general characteristics and floral morphology of Araceae and add a note on economic importance of the family.

GOVERNMENT ARTS COLLEGE, (AUTONOMOUS) SALEM- 636 007

For the candidates admitted from 2017-2018 onwards under CBCS pattern

SEMESTER-III

PAPER-VIII- PAPER CODE : 17PBY08

PLANT PHYSIOLOGY AND BIOPHYSICS

Objectives

1. To learn the underlying principles of the various physiological processes of plants
2. To study the various physicochemical and morphogenetic processes taking place during the various stages of plant growth
3. To understand the principles of thermodynamics

Unit I

Water and plant relations permeability, chemical potential, water potential and osmotic potential in plants. Absorption of water and its mechanism apoplast-symplast transports, mechanism of ascent of sap.

Mineral nutrition: role of micro and macro elements. Mechanism of mineral absorption and phloem transportation. Hydroponics.

Environmental stress: types, Effect of water and salt stress on crop plants. Mechanism of drought and salinity stress resistance.

UnitII

Photosynthesis: pigment system I & II - Emerson's enhancement effect. Photochemical reaction, Non - cyclic and cyclic transport. Photophosphorylation. C₃ pathway. C₄ cycle. CAM pathway. Respiration - Aerobic and anaerobic - Glycolysis - Krebs cycle, Electron transport system. Photorespiration.

UnitIII

Nitrogen Metabolism: Asymbiotic and symbiotic nitrogen fixation. Leghaemoglobin, nod and nif genes. Nitrate reduction. NR and NIR assimilation of ammonia - GDS. GS and GOGAT pathway. Transamination. Interrelationships between GDH, GS Photosynthesis and nitrogen metabolism.

UnitIV

Physiological effects and mode of action of plant growth regulators -auxins, gibberellins, cytokinins, ethylene and abscisic acid, Phytochrome - role and mode of action. Photoperiodism and mechanism of flowering. Vernalization, Senescence, Dormancy.

Unit V

Bioenergetics - laws of thermodynamics. Enthalpy, Entropy., Free energy. Mitochondrial bioenergetics, chloroplast bioenergetics, ATP bioenergetics NADP/ NADHP redox couple bioenergetics. Photobiology: light characteristics of solar radiation. Absorption Spectrum, Action spectrum of molecules. Fluorescence and Phosphorescence, Bioluminescence.

Practicals:

1. Determination of relative water content of leaf material.
2. Measurement of stomatal index and frequency.
3. Measurement of membrane permeability as affected by chemicals.
4. Separation of Photosynthetic pigments by paper chromatography.
5. Estimation of photosynthetic pigments by Arnon's Method.
6. Measurement of rate of respiration in germinating seeds, flower buds using respiroscope.
7. Estimation of total nitrogen by Nesslerization method (or) Microkjeldhal Method.

DEMONSTRATION ONLY

1. Preparation of Knopp's solution (or) Arnon and Hoagland's solution
Hydroponics study
2. Warburg manometry - principle and application
3. Absorption spectrum of chlorophylls.
4. Hormone application (IAA, GA₃, Cytokinin) and seedling growth.

References

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3. Bray CM. 1983. Nitrogen metabolism in plants Longman, England.
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6. Kramer, P. J. 1969. Plant and soil water relationships. McGraw Hill book Company, New York.
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12. Steward F.C (ED) 1956. Plant Physiology (Vol I- VID) Addition clowers & sons, Limited, London
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M.Sc, Degree Examinations
MODEL QUESTION PAPER - THEORY
For the candidates admitted from 2017-2018 onwards under CBCS pattern
SEMESTER-III - PAPER-VIII- PAPER CODE : 17PBY08

PLANT PHYSIOLOGY AND BIOPHYSICS

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A (5X5 = 25)

Answer all the questions:

1. Explain Apoplast and symplast transport
(or)
Give an account on hydroponics
2. Explain Emerson's enhancement effect
(or)
Write an account on cyanide insensitive respiration
3. Give an account on Leghaemoglobin, nod and nif genes.
(or)
Explain NR and NIR
4. Explain the role of CCC and MH
(or)
Give an account on Vernalization
5. Define enthalpy, entropy and free energy
(or)
Explain the absorption spectrum of chlorophyl.

PARTB (5 X 10 = 50 marks)

Answer all questions

6. Write an essay on the mechanism of ascent of sap
(or)
Explain the mechanism of drought resistance
7. Give an account of C₃ Pathway
(or)
Describe the pentose phosphate pathway
8. Write an essay on the symbiotic nitrogen fixation
(or)
Explain the GDH. GS and GOGAT pathway
9. Give an account on the physiological effects of auxins and gibberellins
(or)
Define Photoperiodism and explain the mechanism of flowering
10. Write an account on ATP bioenergetics.
(or)
Explain fluorescence and phosphorescence and add a note on bioluminescence

GOVERNMENT ARTS COLLEGE, (AUTONOMOUS) SALEM- 636 007
For the candidates admitted from 2017-2018 onwards under CBCS pattern

SEMESTER-III

ELECTIVE PAPER - II - PAPER CODE : 17PBYM2

BIOTECHNOLOGY AND BIOINFORMATICS

Objectives:

1. To understand the tissue culture techniques
2. To understand the basic mechanism involved in the production of transgenic microbes, plants and animals
3. To know the biological database

Unit I

Biotechnology - scope and potentialities. Genetic engineering - enzymes -nucleases, polymerases, ligases, Alkaline Phosphatase, reverse transcriptase -SI nucleases - vectors - uses of plasmids and cosmids - Amplification of genes by PCR. cDNA and construction of cDNA libraries - Blotting techniques - Southern Blotting

Unit II

Recombinant DNA technology- gene transfer in plants - aims, strategies for development of transgenic plants - specific and non- specific methods of gene transfer - Particle bombardment, micro and macro injection methods - lipofection- electroporation and - Ti plasmid mediated gene transfer - Application of recombinant DNA technology in crop improvement.

Unit III

Plant tissue culture - concept of totipotency - organization of tissue culture laboratory. Sterilization methods - callus induction, subculture and maintenance. Organogenesis - Anther culture and production of haploids - somatic embryogenesis - isolation, culture and fusion of protoplast - cybrids - micropropagation - Synthetic seeds - Germplasm storage - Cryopreservation.

Unit IV

Bioethics and commercial concern - Commercialization and business opportunities in biotechnology. Intellectual property Rights. Patenting - procedure and application for patent and granting of a patent. Social and ethical issues of Genetically modified crops.

Unit V

Bioinformatics - Scope and applications of Bioinformatics. Need of computer in biological research, Internet - basics, Email, FTP, virtual library. Biological Databases - Classification, NCBI, EMBL and DDBJ, mining the database.

References

1. Dubey, R.C 2001. A text book of Biotechnology S.C. Chand & co. New Delhi.
2. Gamborg O.C. & Philips G.C plant Cell tissue and Organ Culture. NarosaPublishing house, New Delhi.
3. Ignacimuthu S.J. 1998, Basic biotechnology. Tata McGraw hill Publishers, New .Delhi.
4. Kalyanakumar 1992. Plant tissue culture. New central book agency,Calcutta.
5. Kumar H.D. 1993. Molecular biology and biotechnology. Vikas publishers,New Delhi.
6. Kumar H.D. 1998. A text book of biotechnology EWP New Delhi.
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9. Old R.N. and primrose. 1994. Principles of Gene Manipulation, Black wellscientific publications.
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M.Sc., Degree Examinations

MODEL QUESTION PAPER- THEORY 2

For the candidates admitted from 2017-2018 onwards under CBCS pattern

ELECTIVE PAPER - II - PAPER CODE : 17PBYM2

BIOTECHNOLOGY AND BIOINFORMATICS

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A (5X5=25)

Answer all the questions:

Draw labeled sketches wherever necessary

1. a) Write shorty on Southern blotting.
(or)
b) Give a brief account on nucleases.
2. a) Write a short note non-specific methods of gene transfer.
(or)
b) Describe Somatic embryogenesis.
3. a) Give a brief account Anther culture.
(or)
b) Explain Ti plasmid mediated gene transfer.
4. a) Explain commercialization and business opportunities in biotechnology.
(or)
b) Give details of IPR.
5. a) Describe Virtual library.
(or)
b) Write notes on classification of databases.

SECTION-B (5x10=50)

Answer all the questions

6. a) Write notes on PCR.
(or)
b) Give an account of cDNA library construction.
7. a) Explain micro and macro injection methods.
(or)
b) Explain Cryopreservation.
8. a) Explain the protoplast isolation and fusion methods.
(or)
b) Write an essay on particle bombardment.
9. a) Discuss the social and ethical issues of Genetically modified crops.
(or)
b) Explain the application and granting of a patent.
10. a) Enumerate the applications of bioinformatics.
(or)
b) Give a general account on Mining the database.

GOVERNMENT ARTS COLLEGE, (AUTONOMOUS) SALEM- 636 007

For the candidates admitted from 2017-2018 onwards under CBCS pattern

SEMESTER-III - PAPER CODE:17PGNM2

GENERAL STUDIES FOR COMPETITIVE EXAMINATIONS

Unit I -Outline of Indian Polity

Features of Indian Constitution - Fundamental Rights - Directive principles of state policy - President - Parliament - Judiciary - Centre State relation - State Government -Panchayat Raj.

Unit II - Outline of Modern History

Emergence of Indian Nationalism - Indian National Congress - Moderates Extremist Revolutionaries - Gandhian Movements - Partition of India - Integration of Indian States.

Unit III - Outline of Indian Economy and Geography

Planning and Development - National Income - Prices and Inflation - Liberalization - Privatization - Foreign trade - Money and Banking - Physiography of India - Indian Moonsoon -Agriculture - Industry - Demography of India.

Unit IV - Outline of International Politics

Indian Foreign Policy - Foreign Policies of USA, Russia, China - United Nations -Terrorism - SAARC - WTO

Unit V - Outline of Science and Technology

Biotechnology - Nanotechnology - Information Technology - Space Science -Oceanography - Plate Tectonics - Defence Science - Natural Disaster Management.

References

1. Faida - "Politics & Government of India"
2. "International Relations" - Bookhieve Publications
3. Dutt and Sundaram - "Indian Economy"
4. Bipan Chandra - "Freedom Struggle in India"
5. "Science & Technology" - Spectrum Publications.
6. Standard National Newspapers.
7. Competitive Examination Magazines.

GOVERNMENT ARTS COLLEGE, (AUTONOMOUS) SALEM- 636 007

For the candidates admitted from 2017-18 onwards Under CBCS Pattern

SEMESTER – IV

PAPER - IX –PAPER CODE: 17PBY09

BIOCHEMISTRY AND BIOSTATISTICS

Objectives

1. To understand the structure and properties of the biomolecules
2. To know the reactions performed by the biological macromolecules
3. To understand the application of statistical methods in biology

UNIT I

Basic concepts of atoms and molecules - chemical bonds - covalent bonds, hydrogen bond, electrostatic interactions, hydrophobic interactions, Vander waal's forces. Five types of chemical transformations in cells (oxidation - reduction, rearrangement, group transfer, cleavage, and condensation). Optical isomerism. pH and its significance, isoelectric point. Buffer systems Redox, potential.

UNIT II

Carbohydrates: Occurrence, structure and properties of monosaccharides, oligosaccharides and polysaccharides. Biological significance of carbohydrates. Proteins: classification, structure - primary, secondary, tertiary and quaternary -properties and purification of proteins.

UNIT III

Amino acids: structure. D&L forms, classifications, essential and non-essential amino acids, properties. Enzymes: chemistry of enzymes — classification - mechanism of action - factors affecting enzyme activity. Michaelis - Menten model of enzyme kinetics. Co-enzymes, isoenzymes allosteric enzymes, ribozymes and abzymes.

UNIT IV

Lipids: components of lipids - classification of fatty acids. Simple lipids, compound lipids and derived lipids (steroids) - properties of lipids. Biosynthesis and function of terpenoids, alkaloids and flavanoids. Vitamins: structure, types, source and their role.

UNITY

Methods of sampling, classification and tabulation of data, histograms - frequency polygon, frequency curve. Measures of central tendency - mean, median and mode. Measures of dispersion - standard deviation and standard error, student's t-test-chi-square test and analysis of variance.

PRACTICALS

1. Preparation of solutions - percent - ppm, molal, molar and normality concentrations.
2. Preparation of buffers (phosphate & citrate):
3. Estimation of reducing sugars (Nelson -somogyi method)
4. Estimation of total free amino acids (Moore & Stein, 1948.)
5. Estimation of proline (Bates et al., 1973)
6. Estimation of protein (Lowry's method)
7. Estimation of phenol (Mahadevan 1996)
8. Analysis of sample (leaf/ fruit / seed) covering mean, median and mode, histograms, frequency curve - standard deviation and standard error.

DEMONSTRATION EXPERIMENTS:

1. Estimation of oil in oil seeds. .
2. Assay of peroxidase

References:

Biochemistry :

1. Apps 1982 biochemistry EBLs Edn
2. Armstrong F.B. 1980. Biochemistry. Oxford university press, London
3. Bohinsky, R.C 1987. Modern concepts in Biochemistry, allyn and bacon, USA
4. Bonner F.J 1966. Plant biochemistry, academic press, New York.
5. Caret, 1988. Inorganic, organic and biological chemistry, WMC brown Publication USA.
6. Dey, P.M. and Harbone J.B. 2000. Plant biochemistry Harcourt Asia PTE Ltd, Singapore

7. Goodwin and mercer 1986. Introduction to plant Biochemistry Pergamon press.
8. Harbone J.B. 1973. Photochemical Methods. Toppan company Ltd, Japan
9. John JothiPrakash, E., and Joseph A.J.Raja, 2002. An Introduction to Biochemistry. JPR publications, Vallioor, Tamilnadu
10. Lehninger, A.L. Nelson, D.I. And Cox, M.M.I993. Biochemistry CBS Publishers & Distributors, Delhi - 110032.
11. Me Killop, A. 1970. An Introduction to the chemistry of Alkaloids, Butterworths publication, London.
12. Ross C.W. 1981. The biochemistry of plants, Academic press, New York
13. Srinivastava, H.S. 1990. Elements of Biochemistry, Rastogi publications, Meerut.
14. Stryer.L. 1975. Biochemistry, Toppan company Ltd., Toppan, Japan.

Biostatistics:

1. Campbell, R.C 1967. Statistics for biologists, Cambridge University press London
2. Lewis A.E. 1971. Biostatistics, East west press, New Delhi.

M.Sc., Degree Examinations
MODEL QUESTION PAPER – THEORY
PAPER - IX – PAPER CODE: 17PBY09
BIOCHEMISTRY AND BIostatISTICS

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A (5X5=25)

Answer all the questions:

1. Explain oxidation - reduction with suitable example
(or)
Explain the phenomenon of optical isomerism
2. Mention the properties of monosaccharides.
(or)
What are the methods of purification of proteins.
3. Explain the amphoteric nature and isoelectric point of amino acids.
(or)
Explain the Michaelis - Menten Model of enzyme kinetics
4. What are the properties of lipids.
(or)
Give a brief account of terpenoids
5. Write the methods of sampling
(or)
Discuss the analysis of variance.

PART B (5 X 10 = 50 marks)

Answer ALL questions

6. Explain chemical bonds in detail
(or)
Give an account of buffers and their role in biological systems.
7. Write an essay on polysaccharides
(or)
Discuss the structure of proteins with suitable examples.
8. Give a concise account of the properties of amino acids
(or)
Write an essay on allosteric enzymes.
9. Give an account of compound lipids
(or)
What are alkaloids? Describe their structure and function.
10. Explain mean, median, and mode using suitable examples.
(or)
Define standard deviation. Explain the steps involved in calculating Standard deviation by direct method.

GOVERNMENT ARTS COLLEGE, (AUTONOMOUS) SALEM- 636 007
For the candidates admitted from 2017-2018 onwards under CBCS pattern

SEMESTER - IV

PAPER-X-17PBY10

RESEARCH METHODOLOGY

Objectives

1. To understand the various techniques and its application in biological system
2. To study the data collection in biology
3. To understand the tabulation and presentation

Unit I

Measuring devices - Hydrogen ion concentration and pH meter - basic principles and measurement of pH. Oxygen analyzer - basic principles and uses.

Unit II

Chromatography - basic principles and types - adsorption, partition, paper, TLC column, ion exchange and affinity chromatography - electrophoresis - types - electrophoretic mobility and factors - isoelectric focusing - applications.

Unit III

Centrifuge - principles - types - operations - uses. Colorimetry - spectrophotometry — flame photometry—atomic absorption spectrophotometer — construction - principles and uses.

Unit IV

Isotope methodology - radio activity and half life - G.M. counter and Scintillation counter - autoradiography.

Unit V

Scientific data collection, sources and methods - tabulation - graphical and diagrammatic representation - histograms - literature and reference collection - Thesis format- Journal format - citation - proof correction.

Practicals

1. Measurement of pH of fruit juice and soil example
2. Verification of Beer's law using CuSO_4 / $\text{K}_2\text{Cr}_2\text{O}_7$ solutions.
3. Preparation of standard graph for glucose / starch / protein / amino acid

DEMONSTRATION EXPERIMENTS

4. Determination of dissolved O₂ using oxygen analyzer. Analysis of minerals K, Ca, Na from soil / water / plant samples using flame photometer.
5. Separation of protein by Electrophoresis.
6. Quantitative separation of any three standard amino acids by paper chromatography method
7. Separation of photosynthetic pigments by TLC.

REFERENCES

1. Anbalagan, K. 1999. An Introduction to Electrophoresis. Life Sciences Book house, Madurai.
2. Anderson, Thesis and assignment writing.
3. Block R.J. Drum, E.L.Zweign, G. 1958 A Manual of Paper Chromatography and Paper electrophoresis, Academic press Inc, New York.
4. Danulingam, Research Methodology.
5. Goodwin T.W. 1966 Instrumentation in biochemistry Academic press.
6. Harbone, J. B. 1973. Photochemical Methods - A guide to modern Techniques of plant analysis. Chapman & Hall Ltd. London.
7. Jayaram, J 1972. Techniques in Biology, Higginbotham's Pvt. Ltd. Chennai.
8. Purvis, C.J. Collen, D. and Walls, D. Laboratory techniques on Botany Butter worts, London.
9. Sharma, 1993. Instrumental Methods of chemical analysis, Good Publishing house, Meerut.
10. Stock, R & Rice, C.B.E. 1977. Chromatographic methods. Chapman & Hall Ltd, London.

M.Sc, Degree Examinations

MODEL QUESTION PAPER - THEORY

For the candidates admitted from 2017-2018 onwards under CBCS pattern

PAPER-X-17PBY10

RESEARCH METHODOLOGY

Time: 3 hrs

Maximum: 75 marks

(Draw labeled sketches wherever necessary)

PART A (5X5 = 25)

Answer all the questions:

1. List the characters of an ideal buffer
(or)
What is an oxygen electrode? Point out its uses.
2. Write briefly on the advantages of ion exchange chromatography overpaper Chromatography
(or)
Write notes on isoelectric Focussing.
3. Critically analyze the basic of colorimeter.
(or)
Write on Refrigerated centrifuge
4. Explain the construction of G.M. Counters and Principle Involved in measurement
(or)
Write notes on Isotope.
5. With examples cite the uses of tables.
(or)
Write briefly on author citation

PART B(5X10 = 50)

Answer ALL Questions

6. Write an essay on construction, principle and uses of Conductivity Bridge.
(or)
What is pH? How is it measured?
7. Write in detail the principle and application of
 1. Adsorption chromatography
 2. Column chromatography(or)
Describe gel electro phoresis in detail
8. Write an essay on atomic absorption spectrophotometer.
(or)
Describe in detail principles, Types and uses of centrifuge
9. Using liquid scintillation counter how will you measure radioactivity
(or)
Write an essay on Autoradiography
10. How will you write and present thesis
(or)
Write an essay about the sources and methods of data collection

M.Sc., Degree Examinations

BRANCH V - BOTANY

For the candidates admitted from 2017-2018 onwards under CBCS pattern

PRACTICAL -1 - PAPER CODE:17PBYP1

(Algae, Fungi Lichens and Bryophytes, Pteridophytes, Gymnosperms & Palaeobotany,
Microbiology and Plant Pathology)

Time : 4 hrs.

Maximum : 60 Marks

Practical : 50 Marks

Record : 5 Marks

Viva - Voce : 5 Marks

1. Determine whether the given sample 'A' is contaminated with bacteria or not. Leave the slide for evaluation. (5 marks)
2. Make suitable micropreparations of B, C and D. Draw labelled sketches. Identity giving reasons. Leave the slides for valuations. (3x4=12)
3. With Suitable micropreparations, Identity E, F and G. Draw labeled sketches. Identity giving reasons. Leave the slides for valuation (3x4=12)
4. Draw diagrams and write notes of interest of H, I and J. (3x2=6)
5. Name the Genus and group of the macroscopic specimens of K, L and M. (3x2=6)
6. Name the causal organism, disease symptoms and control measures of the pathological specimen N. (9 marks)

Key

A	= Microbiology - Material / Sample to be given
B, C and D	= Algae, Fungi and Bryophytes
E, F and G	= Pteridophytes / Gymnosperms
H, I and J	= Microslides
K, L and M	= Macroscopic specimens
N	= Pathological specimen

M.Sc., Degree Examinations

BOTANY

For the candidates admitted from 2017-2018 onwards under CBCS pattern

PRACTICAL -II- PAPER CODE: 17PBYP2

(Anatomy, Embryology, Microtechniques, Cell, Molecular Biology & Genetics and
Environmental Biology)

Time : 4 hrs.

Maximum : 60 Marks

Practical : 50 Marks

Record : 5 Marks

Viva - Voce : 5 Marks

1. Cut transverse section of A. Identify the anomaly with suitable diagram and reasons. Submit the slide for valuation (8 marks)
2. Dissect and Mount any 2 stages of embryo from the given material B. Submit the slide for valuation. Draw labeled diagrams. Notes not necessary (2x3=6)
3. Identify any 2 stages of cell division each from the given material C and D. Draw labeled diagrams. Notes not necessary. (2x3=6)
4. Construct a meter quadrat E. Analyse the vegetation. Record the data and interest the results. (8 Marks)
5. Solve the Genetic problem F and G (2x3=6)
6. Construct a chromosome map from the given data H. (8 Marks)
7. Write notes on interest, I, J, K and L. (8 Marks)

Key

A = Dicot stem showing anomalous structure.

B = Tridax flower

C,D = Root tip and flower Bud

E = Meter quadrat

F,G = Genetic Problems.

H = Chromosome map

I,J,K,L = Spotters I - Microtechnique

J – Molecularbiology

K - Environmental Biology

L - Cytology

M.Sc., Degree Examinations

BOTANY

For the candidates admitted from 2017-2018 onwards under CBCS pattern

PRACTICAL -III -PAPER CODE:17PBYP3

(Taxonomy of Angiosperms, Plant Physiology and Biophysics)

Time : 4 hrs.

Maximum : 60 Marks

Practical : 50 Marks

Record : 5 Marks

Viva - Voce : 5 Marks

1. Find the Binomials of A and B using Gamble's Flora. (2x5=10)
2. Refer specimens C, D and E to their respective families giving reasons at each level of hierarchy. (3x4=12)
3. Set up the experiment F assigned to you. Record observations and interpret the results leave the set up for valuation (12 marks)
4. Name the family genus and Species of G and H. (2x3=6)
5. Write critical notes on I and J. (2x3=6)
6. Write notes of interest on K and L. (2x2=4)

Key

A, B = Flowering plants from families prescribed from the syllabus

C,D,E = Plants from families prescribed from the syllabus

F = Physiology experiment

G,H = Taxonomy plants

I,J,K = Spotters - in plant physiology Charts / Figures / Graphs / Tables /
instruments/ Chemicals / Models / Photographs.

L = Spotters from Biophysics

M.Sc., Degree Examinations

BOTANY

For the candidates admitted from 2017-2018 onwards under CBCS pattern

PRACTICAL - IV -PAPER CODE:17PBYP4

Biochemistry, Biostatistics and Research Methodology

Time : 4 hrs.

Maximum : 60 Marks

Practical : 50 Marks

Record : 5 Marks

Viva - Voce : 5 Marks

1. Conduct the experiment, A assigned to you by lot. Record your observations and interpret the results. Leave the set up for valuation (12 marks)
2. From the given material B. Find out the mean and calculate the Standard Deviation. Present data in the form of a graph. (10 marks)
3. Verify Beer's law using the given solution C. (10 marks)
4. Find out the pH of the given sample D. (10 marks)
5. Write notes on E, F, G and H (4x2=8)

Key

- A = Biochemistry Experiment assigned by lot
B = Leaf / Fruit 50 in numbers
C = $K_2Cr_2O_7$ / $CuSO_4$ solution.
D = Water sample / Fruit suice
E = Biochemistry
F = Biostatistics
G and H = Research Methodology



GOVERNMENT ARTS COLLEGE (AUTONOMOUS)
SALEM -636007
OFFICE OF THE CONTROLLER OF EXAMINATIONS
M.Sc., BOTANY

COURSE CODE	TITLE	CREDITS	I.A.	S.E.	TOTAL
SEMESTER I					
17PBY01	Paper I : Algae, Fungi, Lichens and Bryophytes	5	25	75	100
17PBY02	Paper II : Pteridophytes, Gymnosperms & Palaeobotany	5	25	75	100
17PBY03	Paper III : Microbiology and Plant Pathology	5	25	75	100
17PBYP1	Practical I. Extended to II semester	-	-	-	-
17PBYP2	Practical II. Extended to II semester	-	-	-	-
17PBYM1	Major Elective Paper I : Plant Resources Utilization and conservation	4	25	75	100
SEMESTER II					
17PBY04	Paper IV : Anatomy, Embryology and Microtechniques	5	25	75	100
17PBY05	Paper V : Cell, Molecular Biology and Genetics	5	25	75	100
17PBY06	Paper VI: Environmental Biology	5	25	75	100
17PBYP1	Practical I. Extended from I semester	4	40	60	100
17PBYP2	Practical II. Extended from I semester	4	40	60	100
17PGNM1	Non Major Elective Paper I: Human Rights	3	25	75	100
SEMESTER III					
17PBY07	Paper VII: Taxonomy of Angiosperms	5	25	75	100
17PBY08	Paper VIII: Plant Physiology & Biophysics	5	25	75	100
17PBYP3	Practical III: Extended to IV semester	-	-	-	-
17PBYP4	Practical IV: Extended to IV semester	-	-	-	-
17PBYM2	Major Elective Paper II: Biotechnology and Bioinformatics	4	25	75	100
17PGNM2	Non-Major Elective Paper - II General studies for Competitive Examinations	3	25	75	100
SEMESTER IV					
17PBY09	Paper IX: Biochemistry and Biostatistics	5	25	75	100
17PBY10	Paper X: Research Methodology	5	25	75	100
17PBYP3	Practical III: Extended from III semester	4	40	60	100
17PBYP4	Practical IV: Extended from IV semester	4	40	60	100
17PBYPR	Project and Viva voce	10	50	150	200
		90			2000