Appendix to UO No Acad/C2/2471/2007 Dated 22/08/2007

KANNUR UNIVERSITY

B.Sc. BOTANY (SUBSIDIARY) SYLLABUS (2007 Admission)

COURSE PATTERN								
Year	Paper	Subject	Hrs/ Week (Theory)	Hrs/ Week. (Practical)	Duration of Theory exam.	Marks Internal	Marks external	Total
1	I	Plant Diversity & Plant Physiology	2 Hours	2 Hours	3 Hours	10	50	60
II	II	Angiosperm Morphology, Angiosperm Taxonony, AngiospermAnatomy, Angiosperm Embryology, Plant Pathology, CropImprovement, Palaeobotany and Economic Botany	3 Hours	2 Hours	3 Hours	10	50	60

Paper – I: Plant Diversity and Plant Physiology	60 Hours	Paper – II: Angiosperm Morphology, Taxonony, Anatomy, Embryology, Plant Pathology, Crop Improvement, Palaeobotany and Economic Botany	90 Hours
Bacteria & Virus	3 Hours	Angiosperm Morphology	10 Hours
Cyanobacteria	2 Hours	Angiosperm Taxonony	30 Hours
Algae	13 Hours	Angiosperm Anatomy	20 Hours
Fungi	5 Hours	Angiosperm Embryology	5 Hours
Bryophyta	5 Hours	Plant Pathology	5 Hours
Pteridophyta	7 Hours	Crop Improvement	5 Hours
Gymnosperms	5 Hours	Economic Botany	10 Hours
Plant Physiology	20 Hours	Palaeobotany	5 Hours

GENERAL SCHEME			
Section.	No of question to be answered	Marks to be Awarded	Total Marks
Part A 10 Marks	Out of three 1 to be answered	1 x 10 =10 Marks	3 x10 = 30 Marks
Part B 5 Marks	Out of five 3 to be answered.	3 x5 = 15 Marks	5 x 5 = 25 Marks
Part C 3 Marks	Out of five 4 to be answered.	4 x 3 = 12 Marks	5 x 3 = 15 Marks
Part D 2 Marks	Out of five 4 to be answered.	4 x 2 = 8 Marks	5 x 2 = 10 Marks
Part E 1 Mark	Out of six 5 to be answered.	5 x1 = 5 Marks	6 x 1 = 6 Marks
Total	**Questions to be attempted: 17**	**Total Marks: 50**	**Total: 86 Marks**

PRACTICAL EXAMINATION

External Practical examination at the end of second year 60 Marks.

Internal - Record of laboratory work 15 Marks

Herbarium **(Internal**) 05 Marks

Total 80 Marks

Grand Total (Theory & Practical) 120 + 80 = 200 Marks

ELIGIBILITY TO APPEAR FOR PRACTICAL EXAMINATION

Record and Herbarium with field book may be submitted for verification.

Internal assessment
Distribution of Marks for each Theory is as follows.

Attendance : 2 Marks
Assignment : 2 Marks (1 only)
Seminar : 2Marks (1 only.)
Test Papers 2x 2 4 Marks (Test papers or Terminal Exams)

Total 10 Marks

KANNUR UNIVERSITY
FIRST YEAR B.Sc. BOTANY (SUBSIDIARY) SYLLABUS

PAPER – I: PLANT DIVERSITY AND PLANT PHYSIOLOGY
(Theory: Teaching hours = 60)
(2 Hours per week)

PLANT DIVERSITY: (40 Hours)
(Developmental details not needed)

VIRUSES & BACTERIA
General account of Viruses and Bacteria.
Structure and reproduction of Bacteriophage.
Economic importance of Viruses and Bacteria. — 3 Hours

CYANOBACTERIA
General account and economic importance.
Nostoc, structure and reproduction. — 2 Hours

ALGAE
General account and classification. — 1 Hour

CHLOROPHYCEAE
General characters and economic importance.
Structure and life history of the following types.
Chlamydomonas, Volvox, Spirogyra, Oedogonium. — 7 Hours

XANTHOPHYCEAE
General characters and reproduction.
Vaucheria, structure, reproduction and life history. — 1 Hour

PHAEOPHYCEAE
General account and economic importance.
Sargassum, structure, reproduction and life history. — 2 Hours

RHODOPHYCEAE
General characters and economic importance.
Batrachospermum, structure, reproduction and life history. — 2 Hours

FUNGI
General characters, classification, Mycorrhiza. — 1 Hour
Economic importance.
Structure, reproduction and life history of the following.
Rhizopus, Puccinia. — 4 Hours
Lichen, brief account only.
Usnea, structure and reproduction.

BRYOPHYTA

General characters, classification and economic importance.
Structure, reproduction and life history of the following.
Riccia, Funaria. 5 Hours

PTERIDOPHYTA

General characters, classification and economic importance.
Structure, reproduction and life history of the following.
Selaginella, Nephrolepis. 7 Hours
(Developmental details viz. Heterospory and seed habit not needed)

GYMNOSPERMS

General account, classification and economic importance.
Cycas, structure, reproduction and life history. 5 Hours

PLANT PHYSIOLOGY (20 Hours)

PLANT WATER RELATIONS

Cell as a physiological unit. Osmosis, Imbibition. Diffusion,
D.P.D. Water potential, Absorption of water, (active & passive).
Plasmolysis, cohesion, tension and transpiration pull theory. 5 Hours

TRANSPIRATION

Significance, factors affecting transpiration, mechanism of stomatal
opening and closing, (k+ transport theory).
Guttation and antitranspirants. 1 Hour

MINERAL NUTRITION

Essential, non- essential, macro and micro elements, brief account only. 1 Hour

PHOTOSYNTHESIS

Significance, site of photosynthesis, pigments, photochemical phase.
Electron transport chain. Photophosphorylation, cyclic and non cyclic.
Biosynthetic phase, Calvin cycle, C3 and C4 pathways.
Photorespiration, Crassulacean Acid Metabolism, factors affecting photosynthesis.
Law of limiting factors, light, temperature, water, nutrient supply.
Leaf factor. Chemosynthesis- a brief account. 10 Hours

PLANT GROWTH & REGULATION

Phases of growth, growth curve.
Plant growth regulators - Auxins, Gibberillins,Cytokinins
Ethylene, Absisic acid - physiological functions only.
Senescence - brief account only. 2 Hours

PHOTOPERIODISM AND VERNALIZATION

Brief account only. 1 Hour

REFERENCES

1. Bilgrami K.S & Dube - A text book 0n Modern Plant Pathology. Vikas Publishing House, New Delhi.
2. Develin & Witham - Plant Physiology-C.B.S.Publishers.
3. Fritsch F.E - Structure and reproduction of Algae. Vol 1 and Vol11 Cambridge University Press London.
4. Kumar & Purohith - Plant Physiology. Fundamentals- Agrobios.
5. Kumar. H.D& Singh A.N - A text book on Algae. Chand & Company.
6. Malik C.P & Srivastava.- A text book of Plant Physiology Kalayani Publishing Co. New Delhi.
7. Pandae & Trivedi - A text book of Fungi, Bacteria and Virus Vikas Publishing House New Delhi.
8. Parihar N.S - An introduction to Bryophyta Central Book Depot Allahabad
9. Smith G.M Cryptagamic Botany Vol 11Mc Grae Hill Co. New Delhi.
10. Smith K.M - A text book of Plant diseases S. Chand & Company.
11. Sporne K.R. - Morphology of Pteridophytes.- Hutchins university Library . London.
12. Vashista P.C. - Gymnosperms—S. Chand & Company. New Delhi
13. Vasistha B, - Bryophyta, S. Chand & Company.
14. Willam G. Hopkins. - Introduction to Plant Physiology. John Wiley.
15. Robert A Wallace. Biology, The world of life. Harper Collins Publishers.

PRACTICALS

Students must be able to:

Make, examine, draw, and identify micro preparations of plant diversity specimens.
Identify the reproductive stages of the above specimens assigning reasons.

PLANT DIVERSITY

a) *Nostoc* colony, trichome enlarged.
b) *Chlamydomonas*, habit
c) *Volvox*, colony with daughter colony, showing zygote.
d) *Spirogyra*, single filament,single cell scalariform and lateral conjugations.
e) *Oedogonium*, single filament, single cell, oogonium with dwarf male.
f) *Vaucheria* thallus, sexual reproduction.
g) *Sargassum*, thallus, stipe T.S, male and female receptacle.
h) *Batrachospermum* thallus
i) *Rhizopus* asexual. and sexual.
j) *Puccinia* -Teleuto Uredo, Pycnial and Aecidial
k) *Usnea* thallus with apothecium, Apothecium V.S.
l) *Riccia* habit, thallus T.S. Thallus T.s. with antheridia and archegonia
m) *Riccia* thallus with sporogonium V.S.
n) *Funaria* gametophyte, gametophyte with sporopyte, archegonial and antheridial clusters
o) *Funaria*, capsule V.S.
p) *Selaginella*, habit, stem T.S., strobilus V.S.
q) *Nephrolepis*, habit, petiole T.S. sporophylls T.S. prothallus , prothallus with s.phyte
r) *Cycas*, seedling, coralloid root T.S., leaf let and rachis T.S. male cone entire and V.S, microsporophyll, megasporophyll. Ovule, ovule V.S.

PLANT PHYSIOLOGY

1. Explain with suitable diagrams and working of experiments setup to demonstrate various physiological phenomena.

a) Osmosis - Thistle funnel osmoscope.
b) Effect of stomatal number on rate of transpiration. (Cobalt chloride test)
c) Effect of root pressure on ascent of sap.
d) Relation between absorption and transpiration. (Water balance)
e) Rate of transpiration by Ganong's potometer.
f) Separation of different photosynthetic pigment using paper chromatography.
g) Rate of photosynthesis by Wilmot's bubbler.

FIRST YEAR B.Sc DEGREE EXAMINATION

(MODEL QUESTION PAPER)

PAPER - I: PLANT DIVERSITY & PLANT PHYSIOLOGY

(Botany Subsidiary)

Time: 3 Hours Max. Marks: 50

(Draw diagrams only when specified)

Part - A

Answer any **one** of the following:

With suitable diagram explain the structure and reproduction in *Rhizopus.*

Explain how light energy is trapped by plants.

Explain the thallus organization and reproduction in *Batrachospermum.*

1 x10 = 10 Marks

Part - B

Answer any **three** of the following:

What is transpiration? How is it differing from guttation? Describe the mechanism involved in the closing and opening of stomata.

Explain the different types of sexual reproduction in Spirogyra.

With the help of a diagram explain the organization of capsule in *Funaria*.

Explain the mechanism of uptake of water in plants.

Describe the process of photorespiration in plants. 3x 5 = 15 Marks

Part - C

Answer any **four** of the following:

With a neat-labeled diagram explain the Telial stage of Puccinia.

What is a prothallus. Explain its structure.

Draw a neat-labeled diagram of Cycas leaflet T.S.

Explain the sexual reproduction in Volvox.

Explain any three factors affecting photosynthesis.

4 x 3 = 12 Marks

Part - D

Answer any **four** of the following:

What is osmosis? How is it different from diffusion?

Write any two xerophytic characters of Cycas.

What is Lichen? Write the name of its fructification.

What is Photolysis? Write its importance in Photosynthesis.

What is vernalization? Write its significance.

4x 2 = 8 Marks

Part - E

Answer any **five** of the following:

What is Plasmolysis?

What is isogamy?

What is meant by columella?

Name a fungus showing torula stage.

What is meant by an indusium?

What is an auxin?

5x 1 = 5 Marks

SCHEME OF EXAMINATION: Hours: 60 Max. Marks: 50

PAPER – I: PLANT DIVERSITY & PLANT PHYSIOLOGY

Part No	Questions	Questions to be answered	Plant Diversity	Plant physiology.
Part A	3 x 10 = 30	1 x10 = 10	2 x 10 = 20	1 x 10 = 10
Part B	5 x 5 = 25	3 X 5 = 15	3 x 5 = 15	2 x 5 = 10
Part C	5 x 3 =15	4 x 3 = 12	4 x 3 = 12	1 x 3 = 03
Part D	5 x 2 =10	4 x 2 = 08	3 x 2 =06	2 x 2 = 0 4
Part E	6 x 1 = 06	5 x1 = 05	4 x 1 =0 4	2 x 1 = 02
Total	**86**	**50**	**57**	**29**

General Scheme.			
Section.	**Number of question to be answered.**	**Marks to be Awarded.**	**Total Marks for all question**
Part A. 10 Marks	1 out of 3 to be answered.	1 x 10=10 Marks	3 x10 = 30 Marks
Part B 5 Marks.	3 out of 5 to be answered.	3 x 5 = 15 Marks	5 x 5 = 25 Marks
Part C 3 Marks.	4 out of 5 to be answered.	4 x 3 = 12 Marks	5 x 3 = 15 Marks
Part D 2 Marks.	4 out of 5 to be answered.	4 x 2 = 8 Marks	5 x 2 = 10 Marks
Part E 1 Mark.	5 out 6 to be answered.	5 x1 = 5 Marks	6 x 1 = 6 Marks
Total questions to be attempted	17	Total Marks- 50	Total 86 Marks

KANNUR UNIVERSITY

SECOND YEAR B.Sc. BOTANY (SUBSIDIARY) SYLLABUS

PAPER - II: ANGIOSPERM MORPHOLOGY, ANGIOSPERM TAXONOMY, ANGIOSPERM ANATOMY, ANGIOSPERM EMBRYOLOGY, PLANT PATHOLOGY, CROP IMPROVEMENT, PALAEO BOTANY AND ECONOMIC BOTANY

(Theory: Teaching hours = 60)
(3 Hours per week)

ANGIOSPERM MORPHOLOGY

Inflorescence.
Racemose, Cymose and Mixed types.
Flower as a modified shoot.
Flower: Parts, arrangement, relative position, numeric plan cohesion, adhesion

Symmetry of flower.Aestivation, types, Placentation, types. Floral diagram and floral formula, Fruits. Classification, simple, aggregate and multiple

10 Hours

ANGIOSPERM TAXONOMY

Objectives & importance of taxonomy.
Brief history of angiosperm classification.
Artificial, natural and phylogenetic.
Detailed study of Bentham & Hooker's system.
Plant nomenclature-Binomial-Genus-Species.
Taxonomic hierarchy.

Herbarium & herbarium technique.
Study of the following families with special reference to morphological adaptation and their economic importance.

(Follow Bentham and Hooker's system)

ANNONACEAE, MALVACEAE, PAPILIONACEAE, CAESALPINIACEAE, MIMOSACEAE,

RUTACEAE, APIACEAE, RUBIACEAE, ASTERACEAE, APOCYNACEAE, SOLANACEAE,

LAMIACEAE, EUPHORBIACEAE.

ORCHIDACEAE, ZINGIBERACEAE, ARECACEAE AND POACEAE. 30 Hours

ANGIOSPERM ANATOMY

Objectives and scope of angiosperm anatomy.
Cell wall organization .A brief account only.
Non living inclusions of the cell.Reserve, secretory and by products.
Tissues—simple, complex, meristematic structure and function
Classification of meristems based on origin and position,
Apical cell theory, Histogen theory, and Tunica-Corpus theory.
Organization of root apex. Primary structures.Root, stem and leaves. Dicots and monocots, Secondary growth, Dicot stem and dicot root.
Anomalous secondary growth, Dicot stem- *Boerhaavia,* Monocot stem-*Dracaena*

20 Hours

ANGIOSPERM EMBRYOLOGY

Microsporogenesis and microgametogenesis.
Mega sporogenesis and mega gametogenesis.
Mega gametophyte. Monosporic – Polygonum type.
Pollination and fertilization.
Dicot and monocot embryo
Endosperm, Nuclear, Cellular and Helobial – brief account only. 5 Hours

PLANT PATHOLOGY

Classification of plant diseases based on causative organisms and symptoms.
Study of the following diseases with reference to their symptom,
etiology, and control measures.
Leaf mosaic of Tapioca, Blast disease of Paddy,Grey leaf spot of Coconut,
Quick wilt of Pepper and Citrus canker. 5 Hours

CROP IMPROVEMENT

Vegetative propagation-budding, grafting, cutting and layering.
Plant introduction and acclimatization.
Plant breeding - Objectives and methods.

Brief account of mass selection, pure line selection and clonal selection.
Mutation breeding, polyploidy breeding and hybridization.
Micro propagation, secondary metabolites. Brief account only.

5 Hours

PALAEO BOTANY

Objectives of Palaeo botany - a brief account only.
Fossil formation - a brief account only.
Fossil Pteridophytes – *Rhynia, Lepidodendron*.
Applied aspects of Palaeo botany. Fossil exploration and fossil fuel. 5 Hours

ECONOMIC BOTANY

Study of the following with special reference to their botanical name, family, morphology of useful parts and uses.
Cereals and Millets - Rice, Wheat and Ragi.
Pulses - Red gram, Green gram, Black gram and Horse gram.
Sugar- yielding - Sugar cane.
Fiber- yielding - Cotton, Coir and Jute.
Dye- yielding - Indigo and Henna.
Latex –yielding - Para rubber.

Oil- yielding -Palm oil, Sesame oil and coconut oil.
Tuber crops - *Tapioca, Amorphophallus* and *Colocasia.*
Tropical fruits - Banana, Jack and Pine apple.
Spices - Cardamom, Clove and Pepper.
Beverages - Tea and Coffee.

Medicinal plants - *Ocimum, Acorus, Adhatoda, Sida ,Phyllanthus*,Turmeric, *Vinca* and *Rauvolf* 10 Hours

PRACTICALS - 60 Hours: (2 Hours per week)

ANGIOSPERM ANATOMY

Students must be able to:
Identify non living inclusions
Raphides, Cystolith, Starch grain, Aleurone grain.
Identify glandular hair on *Ocimum,*

Articulated latex ducts in *Pedilanthus*

Non-articulated latex cell in *Euphorbia*

Schizogenous cavity in *Pinus*
Lysigenous cavity in *Citrus.*
Prepare stained transverse sections, draw cellular diagrams
Identify the following.

Primary structure of dicot stem

Centella, Eupatorium and *Cephalandra.*
Monocot stem-Bamboo and Grass.
Primary structure of dicot root.
Menianthus and Pea.
Monocot root-*Colocasia, Rhoeo*

Dicot stem- secondary

Vernonia and *Tinospora*

Dicot root secondary

Ficus, Tinospora and *Ricinus*.

Dicot leaf-*Ixora*

Monocot leaf-Grass.
Anomalous secondary growth
Dicot stem - *Boerhaavia*
Monocot stem -*Dracaena.*

ANGIOSPERM TAXONOMY

Refer the Angiosperms included in the syllabus to their respective families assigning reasons, draw labeled diagrams of the flower V.S. construct floral diagrams and floral formula and describe using technical terms.

Identify; write the binomial and family of the herbarium specimens submitted by the students.
At the time of practical examination students have to submit laboratory record, herbarium and field book for verification.

CROP IMPROVEMENT

Demonstrate grafting, budding and layering.
Demonstrate the technique of emasculation in *Crotalaria*.

ANGIOSPERM EMBRYOLOGY

Identify: T.S of mature anther, dicot and monocot embryo.

PLANT PATHOLOGY

Identify the plant diseases mentioned in the syllabus

PALAEO BOTANY

Identify with reasons: *Rhynia* and *Lepidodendron.*

ECONOMIC BOTANY

Identify with Botanical name family and morphology of
Useful parts, mentioned in the syllabus.

ANGIOSPERM MORPHOLOGY

No practical - Demonstrate inflorescence and fruits during taxonomy practical.

Need not report in the practical record.

REFERENCES

1 Andrews H.N.Studies on Palaeo botany.C,J Felix.

2 Arnold C.J. Introduction to Palaeo Botany.

3 Bilgrami and Dube. A textbook on modern Plant Pathology.Vikas Publishers.

4 Chowdhary Plant Breeding. Emkay Publishers

5 Cutter E.G. Plant Anatomy.Part 1- Edward Arnold

6 Eames. A.J. Morphology of Angiosperms-McGraw Hill, New York.

7 Esau. K. Plant Anatomy. –Wiley Eastern, New York.

9 Hill A.F.Economic Botany.Mc.Graw Hill, New york.

10 Jeffrey C.Jand Churchil—An introduction to Taxonomy.London

11 Maheswari-P. Embryology of Angiosperms. Vikas Publications.

12. Venkateswaralu. Morphology of Angiosperms. Chand $Company.

13 Vashishta P.C.Taxonomy of Angiosperms.S. Chand and Company.

14 Vashista. P.C.Plant Anatomy—Pradeep Publications.

SECOND YEAR B.Sc. DEGREE EXAMINATION
BOTANY (SUBSIDIARY)

(MODEL QUESTION PAPER)

PAPER - II: ANGIOSPERM MORPHOLOGY, ANGIOSPERM TAXONOMY, ANGIOSPERM ANATOMY, ANGIOSPERM EMBRYOLOGY, PLANT PATHOLOGY, CROP IMPROVEMENT, PALAEO BOTANY AND ECONOMIC BOTANY

Time: 3 Hours Max. Marks: 50

(Draw diagrams only when specified)

Part - A

Answer any **one** of the following:

1 Describe the Bentham and Hooker's system of classification. Write the merits and demerits of this system
2 What is meant by anomalous secondary growth in thickness? Explain with suitable diagram, the anomalous secondary growth in *Boerhaavia* stem.
3 Explain the characteristic features of the family Asteraceae. Why is it considered as the most advanced family among the dicotyledons?

1x10 = 10 Marks

Part - B

Answer any **three** of the following:

4 With suitable diagrams explain different types of Cymose inflorescence.
5 Explain the important floral features of the family Apocynaceae. Draw a neat labeled diagram of the V.S. of the named flower of this family.
6 With a suitable diagram explain the internal structure of dicot root after secondary growth in thickness.
7 Write the botanical name, family, morphology of useful parts and uses of any three spices that you have studied.
8 Explain the different types of vegetative propagation

3 x 5 = 15 Marks

Part - C

Answer any **four** of the following:

9 What is meant by double fertilization and triple fusion?
10 Draw a neat labeled diagram of V.S. of the Cyathium inflorescence. Write 4 important features of this inflorescence.
11 Write the binomial and family of Sesame and Ragi.
12 Write the pathogen, symptom, and control of Citrus canker.
13 With the help of a diagram explain the stem anatomy of *Rhynia*.

4 x 3 = 12 Marks

Part - D

Answer any **four** of the following:

14 Describe the androecium in Papilionaceae
15 What is aestivation? Write any four types.
16 Write any four objectives of plant breeding.
17 What is meant by micro propagation? Write any two importance of it.
18 Why is xylem considered as a complex tissue?

4 x 2 = 8 Marks

Part - E

Answer any **five** of the following.

19 Genera Plantarum.
20 Botanical name of Paddy
21 Causal organism of quick wilt of Pepper.
22 What is meant by Tyloses?
23 In which family is stylopodium found?
24 What is a false fruit?

5 x 1 = 5 Marks

Paper II											
Part No.	**Question & Mark**		**Mor1phology (10)**	**Taxonomy (30)**	**Embryology (5)**	**Economic Botany (10)**	**Pathology (5)**	**Palaeobotany (5)**	**Crop improvement (5)**	**Anatomy (10)**	**Total**
Part A 1 x 10	3x10=30		--	10 (2)	--	--	--	--	--	10(1)	10
Part B 3 x 5	5x5=25		5(1)	5(1)	--	5(1)	--	--	5(1)	5(1)	15
Part C 4 x 3	5x3=15		3(1)	--	3(1)	3 (1)	3(1)	3(1)	--	--	12
Part D 4 x 2	5 x 2=10		2(1)	2(1)	--	--	--	2(1)	2(1)	2(1)	8
Part E 5x1	6x1=6		--	1(3)	--	1(1)	1(1)	--	--	1(1)	5
Total	24	86	10	30	3	9	4	5	7	18	50

B.Sc. PRACTICAL EXAMINATION
BOTANY (SUBSIDIARY)

(MODEL QUESTION PAPER)

Time: 3 Hours Max. Marks: 50

I Take a T.S. of **A** stain and mount in glycerin, draw a cellular diagram of a portion enlarged, label the parts, identify giving reasons. Leave the preparation for valuation
Preparation- 5 marks, labeled diagrams 2 marks, identification 1 mark, reasons 2 marks.
(10 Marks.)

II Refer the specimen **B** to its respective family. Give the systematic position. Point out the important characters of identification.
Identification ½ mark, systematic position 1 mark, reasons 4 ½marks.
(6 Marks)

III Take the V.S of the flower **C,** Leave the preparation for valuation. Draw the V.S. of the flower. Construct the floral diagram and write the floral formula.
V.S 1 mark, diagram 1½ marks, floral diagram 1 mark and floral formula ½ marks.
(4 Marks)

IV Make the micro preparations of **D** & **E**. Stain and mount in glycerin, Leave the preparation for valuation. Draw a labeled cellular diagram Identify giving reasons.
Preparation 3 marks, identification 1 mark, labeled diagram 2 marks, reasons 2 marks.
(8 x 2=16 Marks)

V Identify specimens **F** & **G** with reasons.
Identification ½ mark , reason 1 ½ marks
(2 x 2 = 4 Marks)

VI Identify the disease **H** Name the pathogen. Write the important symptoms.
Disease 1 mark, pathogen 1 mark, symptoms 2 marks.
(4 Marks)

With a labeled diagram explain the working of the experiment **I** Mention the aim.
Aim 1 mark, labeled diagram 2 marks, working 3 marks.
(6 Marks)

VII Identify the specimen **J** giving important reasons.
Identification 1mark, reason 2 marks.
(3 Marks)

VIII Spot at sight **K, L & M**.
(3 x 1 = 3 Marks)

IX Write the botanical name and family of the given specimen N & O.
Binomial ! mark, family !/2 mark.
(1 ½ x 2 = 3 Marks)

X **P** Give the binomial and family of the given herbarium sheet
Binomial ½,marks, family ½ marks, (1 Mark)

SPECIMEN KEY

i. Spcimen **A**: Anatomy of monocot stem, dicot stem and root – primary and secondary - Dicot stem and root, Anomalous growth as *Boerhaavia* stem. Mentioned in the syllabus.

ii. Spcimen **B**: Families mentioned in the syllabus - Avoid monocot families.

iii. Spcimen **C**: Flowers with buds as mentioned in the syllabus - Avoid monocot families.

iv. Spcimen **D**: Thallophyta and **E**: Bryophyta/Pteridophyta.

v. **F -** Embryology. **G -** Anatomy.

vi. **H** - Specimens from pathology mentioned in the syllabus.

vii. **I** - Physiology experiment as mentioned in the syllabus,

viii. **J** - specimen from Palaeo Botany mentioned in the syllabus

ix. **K** & **L** Thallophyta, Bryophyte & Pteridophyta. **M -** Gymnosperm.

x. Specimens **N** & **O** mentioned in the syllabus - direct products only.

xi. **P** Herbarium sheet

Sd/-
Sri. K.S. Prasanna Kumar
Chairman , BOS Botany (UG)