VEER NARMAD SOUTH GUJARAT UNIVERSITY

F.Y. B.Sc.

BIOLOGY

(EFFECTIVE FROM JUNE – 2006)

BIOLOGY PAPER - I (BOTANY)

UNIT I: Morphology:

(1) Aestivation: Definition and types with examples.
(2) Placentation: Definition and types with examples.

UNIT II: Diversities of plants: Cryptogams:

Algae: General characters, classification, thallus, cell structure and reproduction in Spirogyra.

Fungi: General characters, classification, thallus, cell structure and reproduction in Mucor.

Bryophyta: General characters, classification, external and internal structure, reproduction, alternation of generation in Funaria. (Except development)

Pteridophyta: General characters, classification, external and internal structure, reproduction, alternation of generation in Nephrolepis (Fern) (Except development)

UNIT III: Diversities of plants: Phanerogams.

Gymnosperm: General characters, classification, external and internal structure, reproduction and alternation of generation in Cycas. (Except development)

Angiosperms: Classification as per Bentham & Hooker's system of classification, general characters, economic and medicinal importance, Botanical name of common important plants of the following families.

(1) Malvaceae (2) Cucurbitaceae
(3) Apocynaceae (4) Solanaceae
(5) Nyctaginaceae (6) Amarillidaceae

UNIT IV: Anatomy:

(1) Stele: Definition and types.
(2) Vascular Bundles: Definition and types.
(3) Ergastic matters: Starch grain, Aleurone grains, Raphides, Sphaerephides, Cystolith.

UNIT V: Plant physiology:

(1) Imbibition.
(2) Photosynthesis -Definition, pigments, Quantasome (Photosynthetic units), C_3 & C_4 plants and their characteristics. C_3 cycle (Calvin cycle) & C_4 cycle (Hatch & Slack cycle).
(3) Plant movement:
(I) Movement of locomotion:
A. Autonomous movements: (1) Cilliary (2) Amoeboid.
B. Paratonic movements: (1) Phototactic (2) Chemotactic (3) Thermotactic.
(II) Movement of curvature:
A. Growth movements: (1) Phototropism (2) Geotropism (3) Hydrotropism (4) Chemotropism.
B. Variation Movements: (1) Seismonastic (2) Nyctinastic (3) Thigmonastic

UNIT VI: Ecology:

(A) Ecological adaptations of Hydrophytes, Mesophytes and Xerophytes with appropriate examples.
(B) General account of biotic factors on vegetation.

UNIT VII: Plant Pathology:

Causal organisms, symptoms and control measures of the following plant diseases.
(1) Citrus canker.
(2) Rust of Wheat.(Puccinia)
(3) Red rot of Sugarcane.
(4) Green ear of Bajara.

UNIT VIII: Human affairs:

(1) Forests: Importance of forests and their conservation.
(2) Agriculture: Definition and importance of Aqua culture. Silviculture and Horticulture.

UNIT IX: Medicinal plants:

(1) Santalum album.
(2) Adhatoda vasica.
(3) Tinospora cordifolia.
(4) Aloe barbadensis.
(5) Azadirachta indica.

UNIT X: Biotechnology:

Introduction of 'Biotechnology'.
Transgenic plants:- Method, any four examples.
Somatic hybridization, any three examples.
Artificial seed:- Definition, importance.

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PRACTICALS

The candidates should study the typical vegetation in natural condition and should record their observation in journals. Excursion should be arranged during the year to local places. Every candidate shall complete laboratory course in accordance with the regulations issued from time to time by Academic Council on the recommendation of the Board of Studies. Every candidate shall record observation directly in the laboratory journal. Every journal shall be signed periodically. At the end of the year candidate shall produce certified journals at the practical examination.

PRACTCAL: I (BASED ON PAPER I)

MORPHOLOGY:

(1) Aestivation.

(i) Circular
- (a) Valvate: Calyx of Hibiscus
- (b) Twisted: Corolla of Hibiscus.

(ii) Spiral
- (a) Imbricate: Corolla of Caesalpinia.
- (b) Quincuncial: Corolla of Antigonon.
- (c) Vexillary: Corolla of Clitoria.

(2) Placentation.

Study of Placentation to be demonstrated by permanent slides.
- (i) Marginal
- (ii) Axile
- (iii) Free central
- (iv) Parietal
- (v) Superficial
- (vi) Basal

(B) Cryptogames:

(1) Spirogyra:

To study the thallus structure and reproduction (Scalariform and Lateral conjugation).
(Permanent slides of thallus W.M., Scalariform conjugation, Lateral conjugation.)

(2) Mucor:

To study the thallus structure and reproductive structure.
Permanent slides of Mucor vegetative W.M. Mucor sporangia, Mucor Zygospore.

(3) Moss (Funaria):

To study the external features of Funaria.
Permanent slides of Funaria antheridia W.M.
Funaria archegonia W.M. and Funaria
capsule L.S.

(4) Nephrolepis:

Preparation of slides from the fresh material by the students of T.S. of Stolon.
Permanent slides : T.S. of Stolon, T.S. of rachis, T.S. of leaflet passing through sori Nephrolepis prothallus, Fern sori W.M., prothallus with antheridia, prothallus with archegonia, prothallus with sporophyte.

(C) Phanerogams:

(1) Gymnosperm:

Cycas.
Preparation of slides from the fresh material by the students of T.S. of Rachis, T.S. of Leaflet.
Permanent Slides: T.S. of Leaflet, T.S. of Rachis, T.S. of Coralloid root, T.S. of Microsporophyll, T.S. of Megasporophyll, L.S. of Ovule.
Preserve Specimen: Coralloid root, Microsporophyll and Megasporophyll.

(2) Angiosperm: (Families)

Study of Morphological characters of following families.
Floral dissection, T.S of Ovary and floral formulae.
(1) Malvaceae: *Hibiscus rosasinensis, Thespesia, Gossypium.*
(2) Cucurbitaceae: *Coccinia indica* or any locally available plant.
(3) Apocynaceae: *Nerium, Allamanda, Catharanthus roseus, Vinca rosea.*
(4) Solanaceae: *Solanum xanthocarpum* or any locally available plant.
(5) Nyctaginaceae: *Bougainvillea, Mirabilis.*
(6) Amaryllidaceae: *Crinum, Polianthes.*

(D) Anatomy:

(1) Stele: Study of stele from permanent slides:

(i) Actinostele.
(ii) Plectostele.
(iii) Amphiphloic siphonostele.
(iv) Eustele.
(v) Atactostele.

(2) Vascular bundles:

Study of various types of Vascular bundles from Permanent slides.

(i) Radial
(ii) Amphicribral (Hadrocentric)
(iii) Amphivasal (Leptocentric)
(iv) Collateral and open
(v) Collateral and closed
(vi) Bicollateral

(3) Non living cell contents:

Slides are to be prepared by the students from given materials.

(i) Starch grains: Potato tuber, Wheat or Rice Euphorbia tiruculli.

(ii) Aleurone grains: Castor seed.

(iii) Mineral Crystals:

(1) Rephides: Pothos, Colocasia petiole
(2) Sphaeraphides: Opuntia, Nerium leaf.
(3) Cystoliths: Ficus (Banyan) leaf.

(E) Ecology:

(1) Hydrophytes:

(a) Fresh specimens to be shown to the students:

Hydrilla,Vallisneria, Chara, Eichhornia, Pistia, Nymphaea, Marsilea.

(2) Mesophytes:

(a) Fresh specimens to be shown to the students:

Coriander, Trigonella, Allium, Garlic (Entire plants).

(3) Xerophytes:

(a) Fresh specimens to be shown to the students:

Solanum xanthocarpum, Argemone mexicana, Casurina, Aloevera, Opuntia, Euphorbia tiruculli.

(4) Qurdrates method

(F) PHYSIOLOGY:

(Experiment to be demonstrated)

(a) Imbibition and Imbibition force.

1. Test tube experiment.
2. Indictor experiment.

(b) Difference between C_3 and C_4 plant in leaf structure.

(c) Test for Amino acid.

(d) Photosynthetic pigments: Separation of pigment by paper chromatography.

(e) To demonstrate chlorophyll is necessary for photosynthesis.

(f) Plant movements: To demonstrate a phenomenon of phototropism, hydrotropism and geotropism.

(G) CYTOLOGY:

Preparation of slide by squash technique for mitosis.

(H) GENETICS:

Study of interaction of gene 9:7 and 9:3:4 ratio by demonstration.

(I) MEDICINAL PLANTS:

Fresh or preserve specimen for demonstration as per theory.

(J) PLANT PATHOLOGYY:

(1) Citrus canker: Infected Lemon fruit.

(2) Rust of Wheat: infected Wheat leaf or Permanent Slides showing the spores (T.S Wheat: Leaf infected)

(3) Red rot of Sugar cane: Infected canes Sugarcane.

(4) Green ear of Bajra: Infected specimen.

Reference Book For F.Y.B.Sc.

Name of the Book	Author	Publisher
College Botany Vol. I to III	Gangulee, Das, Dutaa	New Central Book Agency, Calcutta
College Botany	A.C. Dutta	Oxford Bombay
Taxonomy of Angiosperms	V.Singh and D.K. Jain	Rastogi Publi-cation, Meerut.
Sapuspi Vanaspati Kudo.	Dr. J.V. Joshi	Uni. Granth Nirman, Board.
Cryptogamic Botany Vol. I to II	G.M. Smith	Tata McGrow Hill, Bombay
Anatomy of Seed Plants	V.Singh and D.K.Jain	Rastogi Publi. Meerut.
College Botany Vol. I to Vol. IV	S. Sundra Rajan	Himalaya Publi-shing House, Girgaon, Bombay
Plant Physiology	S.N. Pandey B.K.Sinha	Vikas Publishing House, New Delhi
Elements of Ecology	P.D. Sharma	Rastogi Publi-cation, Meerut.
Manual of Plant Pathology	S.K. Mistry P.B. Mistry	S. Chand And Company, New Delhi
Vanaspati Shastra	Dr. J.V. Joshi	Popular Prakashan, Surat
Vanaspati Rasayan	Dr. J.V. Joshi	Uni. Granth Nirman, Board.
Prayogik Vanaspati Shastra	Dr. J.V. Joshi, H.K. Patel	Popular Prakashan, Surat
A Text Book of Botany Vol. I (Alagae, Fungi, Bacteria, Viruses, Lichens, Mycoplasma and elementary Plant Pathology	Pandey et. al	Vikas Publishing House Pvt. Ltd. New Delhi.
A Text Book of Botany Vol. II. (Bryophyta, Pteridophyta, Gymnosperms, Paleo Botany.)	Pandey et. al	Vikas Publishing House Pvt. Ltd. New Delhi.