

SOLAPUR UNIVERSITY, SOLAPUR.

Theory and Practical Syllabus

In Botany at B.Sc.Part- III.(Semester pattern.)

To be implemented from June. 2015-16

Solapur University, Solapur.
BOS Section
Revised Syllabus of B.Sc.-III (Botany)

- 1) **Ordinance and regulations:**-As applicable to degree
 As per Solapur University, Solapur.-
- 2) **Title: Subject:**-Botany Under the faculty of Science
- 1) **Year of implementation:**-From June 2015
- 2) **Preamble:**-Solapur University, Solapur has introduced Botany as one of the Principle subjects at B.Sc.Part –III so that the students get acquaint with various Branches of Botany.
- 5) **Objectives:**-To create skilled human resource for Agriculture, Horticulture, Forestry, Biotechnology, Genetic Engineering, Bioinformatics, Competitive exam. etc
- 6) **Duration:**-The entire course is of three years duration but the duration of B.Sc.Part- III Shall be for one year ie- two semester (Sem-. V and VI).
- 7) **Pattern of examination:**-Theory:-Semester System, Practical:-Annual.
- 8) **Fee structure:**-As decided by University and College.
- 9) **Eligibility for admission:**-Botany as one of the subsidiary subjects at B.Sc.II
- 10) **Structure of Course:** The course consists of theory and practicals: -

A) Theory.

Semester	Paper No.	Title of the Paper	Marks
V	IX	Biology of Cryptogams.	50
	X	Gymnosperms and Palaeobotany.	50
	XI	Genetics.	50
	XII	Plant Biochemistry.	50
VI	XIII	Microbiology and Plant Pathology.	50
	XIV	Systematics of Angiosperms.	50
	XV	Microbial Genetics, Plant Breeding and Biostatistics.	50
	XVI	Molecular Biology and Biotechnology.	50

3
B) Practicals

Practical No.	Practicals Based on paper no.	Marks
I	IX and XIII	50
II	X and XIV	50
III	XI and XV	50
IV	XII and XVI	50

11) Scheme of examination:-As per decided by University (BOE)

·The theory examination will be conducted at the end of each semester and each paper

Will carry 50 Marks. There will be four theory papers for Sem.-V and four for Sem -VI

·Practical Examination will be conducted at the end of Semester VI-(Annual) There will be four practicals and each practical will carry 50 marks.

·Question paper will be set in view of /in accordance with the entire syllabus and

Preferably covering each unit. Total Marks for Theory Papers (8x50) =400 and For Practicals (4x50) = 200

12) Standard of Passing:-As per University rules and regulations.

11) Nature of question paper and Scheme of marking:-as applicable to B.Sc. Part I and II (Botany).

12) Equivalence in accordance with title and contents of theory paper (for revised syllabus.)

Sr.No.	Paper No.	Title of old paper.	Marks	Title of New paper with paper no.	Marks.
1	V	Biology of cryptogams, Microbiology and Plant pathology.	100	IX:-Biology of Cryptogams.	50
				XIII:- Microbiology and Plant Pathology.	50
2	VI	Gymnosperms, Palaeobotany and Systematics of Angiosperms.	100	X: Gymnosperms and Palaeobotany.	50
				XIV: - Systematics of Angiosperms.	50
1	VII	Genetics, Microbial Genetics, Plant Breeding and Biostatistics.	100	XI:-Genetics.	50
				XV: - Microbial Genetics, Plant Breeding and Biostatistics.	50
2	VIII	Biochemistry, Molecular Biology and Biotechnology.	100	XII: - Plant Biochemistry.	50
				XVI:- Molecular Biology and Biotechnology.	50

SOLAPUR UNIVERSITY, SOLAPUR.

Theory syllabus (Semester pattern)

In Botany at B.Sc. III

W.E.F. June 2015-16

The present syllabus is in continuation with the previous class B.Sc Part II. This syllabus has been prepared as per UGC curriculum. There will be **four** Theory papers for Semester Vth and **four** papers for semester VIth which will be covered by engaging three lectures per paper per week. Each theory paper will carry **50** Marks. So the total marks for theory will be **200**. There will be **four** practicals per week, each of five periods. At the end of the year (Sem-VIth), there will be a practical examination to be conducted on **four** consecutive days for not less than five hours per day. Each practical will be of 50 marks. So the total marks for practicals will be **200**.

Semester V:-**Paper IX:--Biology of Cryptogams 40 Periods.****Paper X:--Gymnosperms and palaeobotany. 40 Periods.****Paper XI: -- Genetics. 40 periods.****Paper XII:--Plant Biochemistry. 40 periods.****Semester VI:-****Paper XIII:--Microbiology and Plant Pathology 40 periods.****Paper XIV:--Systematics of Angiosperms 40 periods.****Paper XV:--Microbial Genetics, Plant Breeding and Biostatistics 40 periods.****Paper XVI:--Molecular Biology and Biotechnology 40 periods.**

Unit:- 1- Algae :-**(10)**

- 1.1) Occurrence and Distribution of algae.
- 1.2) Thallus organization in algae.
- 1.3) Origin and evolution of sex in algae.
- 1.4) Types of life cycles in algae: - Haplontic, Diplontic, Haplodiplontic-Isomorphic and Heteromorphic, Haplobiontic- Triphasic, Diplobiontic.
- 1.5) Study of life cycles of:-*Chara and Ectocarpus* (Excluding the development of sex organs and sporophyte).

Unit: 2- Fungi: -**(10)**

- 2.1) Reproduction in fungi.
- 2.2) Study of the following types with emphasis on classification, structure of mycelium, nutrition, reproduction and economic importance. a) *Uncinula* b) *Polyporus* (Excluding the developmental stages).
- 2.3) Mushroom cultivation (*Pleurotus*), Economic importance of mushroom.

Unit: 3- Bryophytes: ---**(10)**

- 3.1) Evolution of gametophyte and sporophyte.
- 3.2) Alternation of generation in Bryophytes.
- 3.3) Study of life cycle of *Marchantia* (excluding the developmental stages).

Unit: 4- Pteridophytes: --**(10)**

- 4.1) General account of Pteridophytes with reference to:
 - a) Structure of sporophyte.
 - b) Structure of gametophytes.
 - c) Alternation of generation in pteridophytes.
- 4.2) Study of life cycle of *Marsilea*. (excluding the development of gametophyte and sporophyte).

Reference Books

- 1): An Introduction to Algae.S.SundaraRajan, .Anmol Publications Pvt .Ltd., New Delhi.110002
- 2): A Text Book of Phycology, Pooja, Discovery Publishing House, Pvt.Ltd.New Delhi.110002
- 1): Algae-Botany for degree Students: B.R Vasishta, S.Chand and Co.Ltd.New Delhi.110055.
- 2): Fungi: Botany for degree Students, B.R Vasishta, S.Chand and Co.Ltd.New Delhi.110055.
- 5): The Fungi, B S Mehrotra, Oxford and IBH Publishing Co., New Delhi, 110055.
- 6) A Text Book of Mycology: S.R Mishra, .Discovery publishing House, Pvt.Ltd, New Delhi, 110002.
- 7) Introduction to Mycology. C J Alexopolous, C N Mims, Wiley Eastern Publ. Ltd Ansari Road Daryaganj.New Delhi.110002.
- 8). Morphology of plant and fungi (2th Edition) Blod, I.C., Alexopoulos, G.J and Delevoryas, T, 1980 Harper and Foul Co., New York.
- 9). An Introduction to fungi Dube, I.C. 1990. Vikas Publishing House Pvt. Ltd., Delhi.
- 10).An Introduction to field Mycology: EN. Swanton.,Surbhi Publications ,Jaipur.102001.
- 11): The Fungi.P.D Sharma, RastogiPublications,Shivaji Road Meerut.250002.
- 12) Cryptogamic Botany Vol. I&II (2nd edition) Smith G.M. Tata McGraw Hill Publishing Co., Ltd., New Delhi.
- 11):Beneficial fungi and their Utilization,M.C.Nair,S.Balkrishnan,Scientific publishers,Jodhapur,122001
- 12) A Text book of Bryophyte: R.M Johr, Snehlata, KavitaTyagi.Dominant Publishers and Distributors, New Delhi.110002.
- 15) An Introduction to, Bryophyta, (Embryophyta) N.S.Parihar., Vol-I, Central Book Depot.Alahabad.
- 16): Botany for Degree Student-Bryophyta, B.R Vasishta, S.Chand and Co.Ltd.New Delhi.110055.
- 17) Botany for Degree Student –Pteridophyta, B.R Vasishta, S.Chand and Co.Ltd.New Delhi.110055.
- 18) An Introduction to Pteridophytes. A Rashid-Vikas Publishing house, Pvt.Ltd.Gaziabad U.P.
- 19): Morphology of Pteridophyte, K.R Sporne., B I Publications ,New Delhi.110001
- 20).Vascular Cryptogams (Pteridophytes).P.C.Vasishta, S.Chand and Co.Ltd.New Delhi.110055.

Paper: ---X: Gymnosperms and Palaeobotany.**(40 Periods)****Gymnosperms:****(16)**

Unit:1:-Study of *cycadales-Zamia* and *Gnetales-Gnetum* with reference to distribution, organography, anatomy and reproductive structure-Sporophytes and gametophytes, fertilization, seed structure and phylogeny.

Unit:-2.)Palaeobotany:**(4)**

2.1) a:-Geological time scale.

b: - Carbon dating.

Unit:-3.) a: - Process of fossilization and their types.

(4)

b:-Concept of form genera and nomenclature.

Unit:-4) Study of following form genera with reference to:-

(8)

Systematic position, external morphology, anatomy and affinities of:

a:-*Calamites*

b:-*Cycadeoidea*

c:-*Lyginopteris*

d:-*Enigmocarpon*.

Unit:.5) Applications of palaeobotany in oil and coal exploration :-

(8)

a:-Oil and coal as fossil fuels.

b: - Role of microfossils in exploration.

c: - Biotic origin of oil and coal.

d:-Oil excavation.

Reference Books

- 1). The Morphology of Gymnosperms. Sporne, K.R. 1991 B. I. Publication Pvt., Bombay, Calcutta, Delhi.
- 2) Palaeobotany and the Evolution of Plants (2nd edition). Wilson, N.S. and Rothwell, G.W. Cambridge University Press U.K.
- 1) Morphology and Evolution of vascular plants Gifford, E.M. And poster, A.S. W.H. Freeman and Co., New York.
- 2). Morphology of Gymnosperms. J M Coulter and C J Chamberlain
- 5) -Gymnosperm-Structure and Evolution. C J Chamberlain
- 6) Morphology of Gymnosperms. K K Sporne
- 7) -An Introduction to Palaeobotany. C A Arnold
- 8) Studies in Palaeobotany. H N Andrews –
- 9) Essentials of Palaeobotany. A C Shukla, S P Mishra-
- 10) -Morphology of Vascular plants. A J Eames

Paper: ---XI: - Genetics.

(40 Periods)

Unit: 1.0):-Multiple allelism

(6)

- 1.1) Introduction and definition.
- 1.2) Eye colour in *Drosophila*.
- 1.3) Blood groups in man.
- 1.4) Self incompatibility in plants.

Unit: 2.0):- Sex Determination.

(12)

- 2.1) Autosomes and sex chromosomes.
- 2.2) Mechanism of sex determination.
- 2.3) Sex chromosomes in *Drosophila*.
- 2.4) Sex chromosomes in man.
- 2.5) Balance concept of sex determination in *Drosophila*.—Bridge's Experiment.
- 2.6) Sex linked inheritance in man:-
 - a) Colour blindness
 - b) Haemophilia.
 - c) Holandric genes.

Unit: 3.0):- Quantitative inheritance :-

(7)

- 3.1) Polygene theory.
- 3.2) Population genetics.Hardy –Weinberg's law.

Unit 4.0):- Extra chromosomal inheritance.:-

(8)

- 4.1) Mendelian versus extra chromosomal inheritance.
- 4.2) Examples of maternal inheritance:-
 - a) Mitochondrial inheritance.
 - b) Plastid inheritance

Unit 5.0):- Alteration in the genetic make-up and its significance

(7)

- 5.1) Introduction.
- 5.1) Changes in chromosome number.

Reference Books

- 1) —Cytology and Genetics: Dnyansagar
- 2) - fundamentals of Cytology L W. Sharp
- 1).Principles of Gene Manipulation. Old R.W.and Primrose, S.B. Blackwell Scientific Publications.Oxford UK.
- 2).Plant Chromosomes.Laboratory Methods. Fuikui K and Nakayama S., CRC Press. Boca Raton, Florida.
- 5) Plant Chromosomes: Analysis Manipulation and Engineering.Hawood Sharma A K and Sharma A.1999: Academic Publishing Co.Ausrtaia.
- 6).Principles of Gene Manipulation. Old R.W.and Primrose, S.B.1989 Blackwell Scientific Publications.Oxford UK.
- 7) Genetics: M.L Shrivastav, Shri Publishers and Distributors,, Ansari Road New Delhi,110002.
- 8) Genetics, P.K Gupta, Rastogi Publications, Meerut, 250002
- 9) Genetics and Evolution, H.S Bhamrah, KavitaJuneja, Anmol Publications, Pvt.Ltd. New Delhi, 110002
- 10) Study of Genetics and Evolution, R.H lock, Arihant Publisher, Jaipur.
- 11) Heredity and Genetics, H.V.Bhaskar, Campus Books International. New Delhi.110002.
- 12) Genetics: M.P.Arora and G.S Sandhu, Himalaya Publishing House, Nagpur, Bombay, Delhi.
- 11) An Introduction to Modern Genetics, C.H Waddington, Vandana Publications, New Delhi.
- 12) Genetics, A.M Winchester,Oxford and IBH Publishing Co.,New Delhi.110002.
- 15) Genetics and Developmental Biology,,M.SRanganathan and P Sharma,Wisdom Press ,New Delhi.

Paper XII:--Plant Biochemistry**(40 Periods)****Unit 1.0):-Carbohydrate Metabolism: -****(12)**

- 1.1) Introduction and broad classification.
- 1.2) **Monosaccharides**—Properties and Examples—Trioses, Tetroses, Pentoses and Hexoses.
- 1.3) **Oligosaccharides**—Properties and Examples—Sucrose, Maltose and Lactose.
- 1.4) **Polysaccharides**—Properties and Examples—Starch and Cellulose.
- 1.5) Isomers, enantiomers and epimers
- 1.6) Biosynthesis of sucrose and starch
- 1.7) Degradation of sucrose and starch.

Unit 2.0) Lipid Metabolism :-**(12)**

- 2.1) Introduction and classification
- 2.2) Saturated fatty acids—properties and examples—Stearic and palmitic acids.
- 2.3) Unsaturated fatty acids—Properties and Examples—Linoleic and linolenic acids.
- 2.4) General out line of fatty acid biosynthesis.
- 2.5) Beta oxidation of fatty acids.
- 2.6) Gluconeogenesis of fatty acids during germination.
- 2.7) Properties and significance of lipids.

Unit 3.0):--Protein Metabolism: -**(16)**

- 3.1) Introduction.
- 3.2) General structure, properties and characteristics of essential amino acids.
- 3.3) Brief out line of biosynthesis of amino acids –Aspartate, Cysteine, Phenylalanine and proline.
- 3.4) Protein physico-chemical structure (-primary, secondary, tertiary and quaternary) and outline of classification.
- 3.5) Brief outline of protein biosynthesis in prokaryotes and eukaryotes.
- 3.6) Post translational modifications.

Reference Books

- 1) Plant Physiology by P.S. Gill. Publisher .S Chand and company Limited, Ram nagar New Delhi.110055.
- 2) Fundamentals of Plant Physiology. , J L Jain. .S Chand and Company Limited, Ram nagar New Delhi.110055.
- 1) Plant Physiology V. Verma, EMKAY Publications. B-19, East Krishnanagar Delhi.110051.
- 2) Introductory Plant Physiology .G Ray Noggle&Frtiz.Prentice Hall of India.PvtLtd.New Delhi.110001.
- 5) Plant Physiology. Salisbury and Ross, CBS Publishers and Distributors. Jain Bhavan Bholanathnagar, Shahadara-Delhi.110012.
- 6) Plant Physiology, V I Palladin, Arihant Publications, Jaipur. (INDIA)
- 7) Physiology of Transpiration in Plants by .SundaraRajan. Anmol Publications, Pvt.Ltd. New Delhi.110002.
- 8) Laboratory Plant Physiology, Bernard S Meyer, D B Underson, C A Swanson. East west Press Pvt.Ltd.New Delhi.
- 9) Physiology of Crop plants, F P Gardner B Pearce, R L Mitchell. Scientific Publishers Ratanada Road, P O Box 91, jodhpur.122001.

- 10) Plant Physiology , R C Grewal Campus Books International, Prahlad Street, Ansari Road, Daryaganj, New Delhi. 110002
- 11) Plant Physiology , Robert M. Devlin. East west-Press Pvt. Ltd. New Delhi.
- 12) Plant Physiology , Devlin and Witham-CBS Publishers and Distributors. Jain Bhavan Bholanathnagar, Shahadara-Delhi. 110012.
- 11) A Text Book of Plant Physiology. C P Maik & A K Shrivastava, Kalyani Publishers, New Delhi.
- 12) Plant Growth and Development, Leopold, A C (1972) McGraw-Hill Book Company, Inc. New York.
- 15) Elements of Enzymology. A N Shukla, Discovery Publishing House, Ansari Road, Daryaganj, New Delhi. 110002
- 16). Fundamental Laboratory Approaches for Biochemistry and Biotechnology. Ninf, A J. and Ballou D P. 1998 Fitzgerald Science Press Inc. Maryland USA.
- 17). Techniques and Practices of Chromatography Scott, R P W. 1995 .Marcel Dekker inc. New York.
- 18): Experimental Biochemistry. Dryer R L and Lata G F 1989 Oxford University Press. New York.

Semester: - VI

Paper:--XIII:--Microbiology and Plant Pathology (40 Periods)

Microbiology.

- Unit:-1)** Methods in Microbiology:--Sterilization Methods, types of Culture Media, Pure culture methods. (8)
- Unit:-.2)** Introduction to microbiology, Classification and characteristics Features of different groups of microbes. (8)
- Unit:-.3)** Industrial applications of micro-organisms- Organic acids (Citric acid), Ethyl Alcohol, food processing, Milk products, Antibiotics and Biopesticides. (8)

Plant Pathology: -

Unit:-4) Classification of plant diseases based on pathogen,Crops, Symptoms and Transmissions of pathogens – seed born, soil born, air born. (6)

Unit:-5) Plant Diseases. (5)

a) **Phytoplasma-** -Grassy shoot disease of Sugarcane

b) **Viral disease-**Leaf curl of Chillies.

c) **Bacterial disease**—Bangadi disease of Potato

d) Fungal diseases— (5)

i) Downy mildew of Bajara.

ii) Tikka disease of Groundnut.

iii) Grain Smut of Jowar.

iv) Anthracnose of Bean.

Reference Books

1) Plant pathology. P.D.Sharma.RastogiPublication.Shivaji Road Meerut.250002.

2) Fundamentals of Plant pathology.V.N.Pathak, N.M.Khatri and M.Pathak Publ.

Agro bios (India).Agro house Chopasani Road Jodhpur 122002.

1) Agricultural Microbiology.G.Rangaswamy and D.J.Bagyaraj Prentice Hall of India. Pvt. Ltd.New Delhi.110001

2) MycorrhizalSymbiosis.Harley, J.L. and smith S.E. (1981), Academic press London.

5) Experiments in Microbiology, Plant Pathology and Biotechnology. K R Aneja.

New Age International (pvt.Ltd) Publishers.Ansari Road Daryaganj New Delhi 110002.

6) Mycorrhizal Symbiosis Harley J L and Smith S E (.1981) Academic Press London.

7) C J Alexopolous, C N Mims, Introduction to Mycology. Wiley Eastern Ltd Ansari Road Daryaganj.New Delhi.110002.

- 8) Josef Charles Walker Diseases of Vegetable crops. Srishti Distributors, JMD House, Ansari Road Daryaganj, New Delhi. 110002.
- 9) G Ragaswamy and A Mahadevan. Diseases of crop plants in India. Prentice Hall of India Pvt Ltd. New Delhi, 110001
- 10) S. Nagarajan. Plant disease Epidemiology, Oxford and IBH Publ. Coy. Ltd. New Delhi. (1981):
- 11) S.A Tarr. Principles of Plant pathology. Mac Millan Publishers Ltd. London
- 12) V.N. Pathak: Laboratory Manual of Plant Pathology (2nd.Ed.) Oxford and IBH Publishers, New Delhi. (1982).
- 11) R.S. Singh, Introduction to Principles of Plant Pathology. Oxford and IBH Publishers, New Delhi. (1982).
- 12) Text book of Plant Pathology. S.K. Singh and Seema, Shrivastava, Campus books International, Ansari Road New Delhi.
- 15) Plant pathology. G.K. Gupta, Discovery publishing house New Delhi.
- 16) Molecular Plant Pathology. Ixman Desai, Paragon International publishers, Ansari Road New Delhi.
- 17) Plant Protection. K.M. Chandniwala, Anmolpubs. Pvt. Ltd. New Delhi.
- 18) Emerging Trends in Mycology, Plant pathology and Microbial Biotechnology. G. Bagyanarayana, Bhadracharya, I.K. Kunwar. B.S. Publication Sultan bazaar Hyderabad.
- 19). Mandahar, C.L. 1998 Introduction to plant Viruses Chand & Ltd., Delhi.
- 20). Clifton, A. 1958 Introduction to the Bacteria McGraw Hill Co., New York.
- 21)) Mehrotra R S. Plant Pathology Tata McGraw-Hill Co. New Delhi.
- 22)) D A Johnson- Plant Micro techniques.
- 21) Mahadevan and Sridhar R. 1986; Methods in Physiological Plant Pathology. Sivakami Publication Madras.
- 22)) Schhad N W. 1988: Plant Pathogenic Bacteria. Laboratory Guide for Identification of Plant Pathogenic Bacteria. Academic Press.
- 25) Cunasekaran, P. 1995: Laboratory Manual in Microbiology. New Age International Pvt .Ltd.
- 26) Pawse P K. 1972: Techniques with Bacteria-A Guide Book for Teachers. Hutchinson Educational.
- 27) Eklund C. and Lankford, C W E. 1967. Laboratory Manual for General Microbiology. Prentice Hall Inc. Engle-Wood cliffs N J.

- 28) Agrios G.N. 1997. Plant Pathology, Academic Press London.
 19) Albajes, R., Gullino, M. L. VanLentern, J.C. and Elad, Y. 2000. Integrated Pest and disease management in greenhouse crops, Kluwer Academic Publishers.
 10) Agricultural Microbiology. G. Rangaswamy and D.J. Bagyaraj Prentice Hall of India. Pvt. Ltd. New Delhi. 110001
 11) Experiments in Microbiology, Plant Pathology and Biotechnology. K R Aneja. New Age International (pvt.Ltd) Publishers. Ansari Road Daryaganj New Delhi 110002.

Paper XIV:-Systematics of Angiosperms (40 Periods)

- Unit 1.0:-Phylogeny of Angiosperms:- (3)**
 1.1) A general account of the origin and evolution of Angiosperms (with special reference to Bennettitalean and Gnetalean theory).
 1.2) Primitive and advanced features of flower.
- Unit 2.0:- Systems of Classification: - (3)**
 2.1) Engler and Prantl's system. Its Merits and demerits
- Unit 3.0:- Modern Taxonomy: - (3)**
 3.1) Taxonomy in relation to anatomy, embryology, palynology, Cytology. (Cytotaxonomy).
- Unit 4.0:-Flower:- (3)**
 4.1) Concept of flower as a modified shoot. (3)
 4.2) Structure and development of anther, Microsporogenesis, Development of Male gametophyte. (3)

- 4.3) Structure of pistil -Structure of typical ovule, ovule types. Megasporogenesis, Female gametophyte (Embryo sac) Embryo sac types.—Monosporic, Bisporic and Tetrasporic. (5)

Unit 5.0:-Pollination and fertilization (5)

- 5.1) Mechanism of pollination and agencies.
 5.2) Pollen germination and pollen tube growth.
 5.3) Fertilization.
 5.4) Double fertilization.
 5.5) Endosperm.

Unit 6.0:--Seed and Fruit :- (3)

- 6.1) Development of embryo in Dicotyledons.
 6.2) Seed and fruit dispersal

Unit 7.0:-Angiosperm families (12)

- 7.1) Study of the following angiosperm families with respect to systematic Position, morphological characters, distinguishing features and economic importance.
 i) Ranunculaceae ii) Capparidaceae iii) Rutaceae iv) Myrtaceae v) Cucurbitaceae
 vi) Rubiaceae vii) Apocynaceae viii) Lamiaceae ix) Polygonaceae x) Cannaceae
 xi) Poaceae.

Reference Books:

- 1) Cronquist, A. 1968 The Evolution and Classification of flowering plants. Thomas Nelson (Printers) Ltd., London and Edinburgh.
2. Delevoryas, 1965 The Plant Diversifications. Modern Biology series. Half Rinehart and Wiston, New York.
1. Foster, A.S. and Gifford, A.E. M. Jr. 1967 Comparative Morphology of vascular plants Vakils Peffer and Simons Pvt. Ltd.
2. Sporne, K. R. 1977. The Morphology of Angiosperms B.I. Publication Bombay.
5. Bhojwani, S.S. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms 2th revised and enlarged edition, Vikas Publishing House, Delhi.
6. Johri, B.M. 1982. Embryology of Angiosperms. Springer – Verlag Berlin.
- 7) Raghavan, V. 1997. Molecular Embryology of Flowering plants. Cambridge University press, New York.
- 8) T C Cook:-The Angiosperm Floras. Vol - I, II & III.
- 9) A J Eames.-Taxonomy of Angiosperms.
- 10) R N Sutar- Text Book of Taxonomic Botany.
- 11) A.S Hitchcock-Methods of Descriptive Systematic Botany.
- 12) V N Naik –Taxonomy of Angiosperm.
- 11) H. Santapan-Flora of Khandala.
- 12) P Maheshwery-An Introduction to Embryology of Angiosperm
- 16) Davis P H. and Haywood, V H. 1961 Principles of Angiosperm Taxonomy, Oliver and Royd. London.
- 17) Heywood, V H. and Moore D M. 1982, Current concept in Plant Taxonomy, Academic Press, London.

- 18) Jones, S.B. and Luchsinger, A E. 1986, Plant Systematics (2nd Edn.) TATA McGraw-Hill Co. New York.
- 19) Lawrance, G.H.M. 1951. Taxonomy of vascular Plants. MacMillan, New York.
- 20) Naik, V.N. 1982. Taxonomy of Angiosperm. TATA McGraw-Hill Co. New York.
- 21) Radford, A.E. 1986. Fundamentals of Plant Systematics. Harper and Row, New York.
- 22) Singh G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH Pvt Ltd. New Delhi.
- 21) Jeffrey, C. 1982. An Introduction to Plant Taxonomy. Cambridge University Press. Cambridge London.
- 22) Stace C.A. 1989. Plant Taxonomy and Biosystematics. 2nd. Edn. Edward Arnold. London.
- 25) Woodland D.E. 1991. Contemporary plant Systematics. Prentice Hall, New Jarsay.
- 26) A J Eames and M C Danialls; An Introduction to Plant Anatomy
- 27) P K Nair Pollen Grains of Western Himalayan Plants.
- 28) G Erdtman. Pollen Morphology and Plant Taxonomy.
- 29) Raghavan V. 1986. Embryogenesis in Angiosperm: Development and Experimental Studies Cambridge University Press New York, USA.
- 10) Nordenstam. B, El-Gazaly., G and Kassas, M. 2000 Plant Systematics for 21st Century. Port Press Ltd. London.

Paper: XV- Microbial genetics, Plant Breeding and Biostatistics (40 Periods)

Unit 1.0 –Microbial Genetics.

(9)

- 1.1) Introduction.
- 1.2) Bacterial genome
- 1.3) DNA Viruses
- 1.4) RNA Viruses.
- 1.5) Recombination in bacteria –Conjugation, Transformation and Transduction.

- Unit 2.0:-Methods of Plant improvement - (13)**
- 2.1) Introduction
 - 2.2) Aims and Objectives of plant breeding
 - 2.3) Scope of plant breeding.
 - 2.4) **Methods of plant breeding**
 - I) Introduction and Acclimatization
 - II) Selection.-Mass selection, Pure line selection and Clonal selection.
 - III) Hybridization.
 - Breeding In self and cross pollinated crops. (7)**
 - 2.5) **Breeding in field crops.**
 - a) Breeding in Cotton.
 - b) Breeding in Sugarcane.
- Unit 3.0 Role of Mutation and Polyploidy in plant breeding. (1)**
- Unit 4.0:-Biostatistics: -- (8)**
- 4.1) Collection and presentation of data.
 - 4.2) Measures of central tendency-Mean, Mode and Median
 - 4.3) Tests of significance (T- test), Chi- square (χ^2 -test.)
- Unit 5.0) Applications of computer in Plant science (2)**

Reference Books:-

- 1) Atherly A G, Girton J R. and Snustad D P. 1991: Principles of Genetics. (8th Edn.) John Wiley and Sons, New York.
- 2) Gupta P K. Genetics. Rastogi Publications, Shivaji Road Meerut.
- 1) Hartal D L and Jones E W 1998: Genetics: Principles and Analysis. (2th Ed.) Jones and Barlett Publishers. Massachusetts., USA.
- 2) Russel, P J 1998: Genetics (5th Edn.) The Benjamin/Cummings Publishing Co. Inc. USA.
- 5) Snustad. D P and Simmons M J.: 2000 Principles of Genetics. (2nd Edn) John Wiley and Sons. Inc. USA.
- 6) Dnyansagar—Cytology and Genetics
- 7) Plant Breeding—Principles and Methods: B D Singh, Kalyani Publishers Ludhiana.
- 8) A Text Book of Biostatistics:-Vol-I and II., A. K Sharma, Discovery Publishing House, New Delhi, 110002.
- 9) Understanding Biostatistics:-Sharad Shrivastav. Discovery Publishing House, New Delhi, 110002.
- 10) Poehlmann, J M. and Sleeper d R. 1995: Breeding Field Crops. Panima Publishing House. New Delhi.
- 11) Simmonds N W. 1979: Principles of Crop Improvement Longman, London and New York..
- 12) Sharma J R 1992: Principles and Practice of Plant Breeding. Tata McGraw _Hill Publishing Co. Ltd. New Delhi.
- 11) A K Aiyer Field Crops of India.

Paper:--XVI:-Molecular Biology and Biotechnology. (40 Periods)**Unit 1.0:-DNA replication and recombination. (5)**

- 1.1) Structure and forms of DNA.
- 1.2) Replication of DNA.—Types and Mechanism.
- 1.3) Denaturation and renaturation of DNA.
- 1.4) Recombination at molecular level.

Unit 2.0:- Gene structure, expression and regulation. (8)

- 2.1) Gene organization in prokaryotes and eukaryotes.
- 2.2) Operon concept.-lac operon.
- 2.3) Gene regulation in prokaryotes and eukaryotes.

Unit 3.0:- Recombinant DNA Technology. (12)

- 3.1) Introduction and principles.
- 3.2) Enzymes involved in recombinant DNA Technology
- 3.3) Vectors.
- 3.4) Southern and northern blotting technique.
- 3.5) DNA finger printing.
- 3.6) PCR.
- 3.7) DNA libraries

Unit 4.0:-Genetic Engineering. (6)

- 4.1) Marker and Reporter genes.
- 4.2) Methods of gene delivery-Physical, Chemical and Biological.(*Agrobacterium* mediated gene transfer).

- 4.3) Introduction to transgenic plants.
- 4.4) Achievements in plant Biotechnology.

Unit 5.0:-Plant Tissue culture.

(9)

- 5.1) Introduction and terminology
- 5.2) Micro propagation.
- 5.3) Anther culture.
- 5.4) Protoplast isolation and culture.
- 5.5) Somatic Hybridization.

Reference Books:-

- 1) Albert B,BrayD,LewisJ.RaffM.RobertsK.andWastsons J D.1999 Molecular Biology of Cell.Garland Publishing Co.Inc.New York.
- 2) Bhojwani S S.1990: Plant Tissue Culture Applications and Limitations Elsevier Science Publishers.New York USA.
- 1) Devi P 2000: Principles and Methods of Plant Molecular Biology, Biochemistry and Genetics.Agrobios, Jodhpur, India.
- 2) Dixon R A 1987: Plant Cell Culture A Practical Approach, IRL Press, Oxford.
- 5) Buchanan, B.B.Grussem W and Jones R.L 2000 Biochemistry and Molecular Biology of Plants.American Society of Plant Physiologists Maryland USA.
- 6) Lea P J.and Leegood,R.C.1999 Plant Biochemistry and Molecular Biology. 2nd Edn. John Wiley andSons.Chichester, England.
- 7) Lodish, H Berk, A .Zipersky.,S.L.Matsudaira.P.Baltimore.andDarnel.J. 2000 Molecular Cell Biology.2th Edn.W.H Freeman and Co.New York, USA.

- 8) Vasil L K.and Thorpe, T A.1992.Plant Cell and Tissue Culture.Cluser Academic Publishers, Netherlands.
- 9) Hackett, P B.Fuchs, J A. and Messing J W.1998.An Introduction to Recombinant DNA Techniques: Basic Experiments in Gene Manipulation. Benjamin/Cummings Publishing Co.Inc.Menlo Park California.
- 10) Hall R D.1999.Plant Cell Culture. Protocols. Humana Press Inc.NewJersey, USA.
- 11) Glick B R and Tompso, J E 1991: Methods in Plant Molecular Biology and Biotechnology. CRC Press Boca. Raton .Florida.
- 12) Dryer R L and Lata G F1989: Experimental Biochemistry. Oxford University Press.New York..
- 11) Persely, G J.1996.Biotechnology and Integrated Pest Management. CAB International UK.

Solapur University, Solapur
Practicals in Botany at B. Sc.III
W.E.F. June 2015

- Practical –I- (Based on Paper- IX and XIII) =50 Marks.**
Practical- II- (Based on Paper X and XIV) =50 Marks.
Practical- III-(Based on Paper XI and XV) =50 Marks.
Practical- IV – (Based on Paper XII and XVI) =50 Marks.

PRACTICAL EXAMINATION

B Sc.Part III (BOTANY)

Each candidate must produce a certificate from Head of the Department stating that He/She has completed the practical course in a satisfactory manner, on the lines laid down from time to time by the Academic Council on the recommendations of the Board of Studies and that the Laboratory Journal has been properly maintained. The candidate must have recorded his /her observations directly in his/her laboratory journal and written their report of each exercise performed. Every journal shall be checked and signed periodically by concerned teacher and certified by the head of the Botany Dept.at the end of academic year.

Candidate shall present the followings at the time of Examination.

- 1) Certified Laboratory Journal/s, with tour report and fieldwork report.
- 2) At least 10 herbarium specimens well mounted on sheets, 10 preserved specimens,

10 permanent slides (5 microtomy and 5 cytological). The candidates shall be orally examined (Viva-voce) for their submission. The student will not be allowed to appear for the practical examination unless he/she submits the Journal, submission report and Excursion report duly certified by Head of the Botany Dept.

Fieldwork and Tour report:--

In addition to the number of practicals prescribed, the students are required to undertake field excursions to the places of botanical interests, Research centres / Industrial places under the guidance of teachers. There shall be frequent study tours in local areas. One of excursions shall be to an area having different botanical characters for not more than 12 days. There shall be one teacher in- charge for a batch of student up to 12 and one additional lady teacher is allowed whenever there are female candidates and T.A and D.A be paid to the teachers, peon and field collector as per University rules.

The record of fieldwork, visit report and report of the excursion have to be written in the journal or separately which will be duly signed by the teacher in-charge and certified by the Head of Botany Department. Collection of rare flowering and non flowering plants such as **Orchids, Ceropogia, Gnetum, Isoetes, Ophioglossum, Equisetum, Osmunda** etc. should be avoided during the excursion. Avoid massive collection of plants. Collection of common weed plants should be preferred. Certified

journal and excursion report will be considered for assessment by the examiners. There are 50 marks for each practical. Distribution of marks for each practical is as follows.

Distribution of Marks for Practicals

B. Sc. III -Botany Practical:-I (Based on Paper IX and XIII)

Cryptogams (Algae, Fungi, Bryophytes, Pteridophytes each for six marks.)	24 Marks.
Plant pathology -----	4Marks.
Culture technique. -----	4 Marks.
Fermentation technique.-----	4Marks.
Micrometry.-----	4 Marks.
Submission -----	5 Marks.
Journal.-----	5 Marks.

Total Marks:—50

B. Sc.III- Botany Practical:-II (Based on Paper X and XIV)

Gymnosperms.-----	8 Marks.
Palaeobotany.-----	4 Marks.
Angiosperm Families.-----	10 Marks.
Genus and Species.-----	5 Marks.
Morphology.-----	2 Marks.
Embryology -----	6Marks.
Tour Report.-----	5 Marks.
Submission.-----	5 Marks.
Journal.-----	5 Marks.

Total Marks:-50

B. Sc. III -Botany Practical: - III (Based on Paper XI and XV)

Genetic Example.-----	6 Marks.
Karyotype/Abnormalities/Varrations in chromosome number.-----	10 Marks.
Identification of mutants/pollination mechanism.-----	6 Marks.
Breeding Technique/Crop Varieties Identification.-----	8 Marks.
Male Sterility/self incompatibility/Meiosis technique.-----	5 Marks.
Biostatistics.-----	5 Marks.
Submission. -----	5 Marks.
Journal. -----	5 Marks.

Total Marks:—50.

B.Sc.III- Botany Practical: - IV (Based on Paper XII and XVI)

Biochemistry.-----	13 marks
Molecular Biology.-----	13Marks.
Biotechnology. -----	9 Marks.
Submission of Microtomy slides and oral on Microtomy.10 Marks.	
Journal.-----	5 Marks.

Total Marks:--50.

B.Sc. Part- III: - Botany Practicals
Practical –I (Based on Paper IX and XIII)

1 & 2:- Identification of following algae. (Any four.)

a) *Oscillatoria* b) *Volvox* c) *Pediaea*. d) *Caulerpa*. e) Diatoms.

3:- Life cycle of *Chara*.

4:- Life cycle of *Ectocarpus*..

5:- Identification of following fungi. (Any four)

a) *Phyllachora*. b) *Alternaria*. c) *Clavaria*. d) *Melanospora*.

e) *Rhizopus*.

6:- Life cycle of *Uncinula*.

7:- Life cycle of *Polyporus*.

8:- Cultivation of Mushrooms. (Demo.)

9 & 10:- Identification of following Bryophytes. (Any four)

a) *Plagiochasma*. b) *Anthoceros*. c) *Cyathodium*. d) *Notothylas*.

e) *Fossombronia*. f) *Asterella*.

11 and 12:- Life cycle of *Marchantia*.

13 & 14:- Identification of following Pteridophytes. (Any four.)

a) *Isoetes* b) *Adiantum* c) *Lycopodium*. d) *Osmunda*.

e) *Asplenium*. f) *Azolla*. g) *Blechnum*. h) *Ophioglossum*

- 15:- Life cycle of *Marsilea*.
- 16:-Preparation of PDA and Sterilization.
- 17 and 18:-Isolation of soil fungi and Inoculation of agar slants
- 19:-Micrometry.
- 20,21 and 22:-Plant Diseases as per theory.
- 23:-Study of Fermentation by yeast, by Kuhne's tube Method.
- 24 and 25:- Microbial Staining. (Demo.)

Practical –II (Based on Paper X and XIV)

- 1:-Study of Anatomical structure in rachis of *Cycas* and *Zamia*. (by Section)
- 2:- Study of Anatomical structure in wood of *Pinus* (by section and maceration).
- 3:- Study of male and female cones of *Gnetum*.
- 4:- Study of pollen grain structure of *Gnetum* (shape, size Exine, germ pore, number and number of constituent cells).
- 5:- Study of fossil types-Impression, Compression and Petrification.
- 6:- Study of fossils –*Calamites*, *Cycadeoidea*, *Lyginopteris* and *Enigmocarpon*.
- 7:-Study of V.S. of typical ovule and ovule types.
- 8:-Study of pollen grain germination. (hanging drop and sitting drop techniques in *Impatiens* and *Catharanthus roseus* or any other suitable material).
- 9:-Diversity in structure of stigma, style, stigmatic papillae and transmitting tissue of style in suitable material (*Clitoria*, *Hibiscus*, Maize, *Ocimum* and *Citrus*).
- 10:-Study of embryo with suspensor in cucurbitaceae. (Micro dissection).

- 11:-Study of seed dispersal with suitable materials.
 12:- Study of fruit dispersal with suitable materials.
 13& 14 - Study of Herbarium technique.(Demo.)
 15 to 24:-Study of the following plant families.
 i) Capparidaceae ii) Rutaceae iii) Myrtaceae iv) Rubiaceae v) Apocynaceae vi) Lamiaceae vii) Polygonaceae viii)Poaceae.

25:- Identification of genus and species with the help of any flora.

Practical:- III (Based on paper- XI and XV)

- 1:- Examples on polygene inheritance.
 2 And 3 Determination of chromosome count in *Allium cepa/Iphigenia* root tips.
 4 And 5 Study of meiosis in PMC of *Allium* or any other suitable material.
 6:- Preparation of karyotypes-idiograms by using photographs.
 7:- Determination of interspecific variation in chromosome number in *Allium*.
 8:- *Culture of Drosophila*.
 9:- Study of giant chromosomes in *Drosophila*.
 10 & 11 Detection of meiotic anomalies in chromosomes in *Rhoeo*.
 12 and 13 Identification of mutant phenotypes. –Body shape/nature of wings/eye colour /nature of eye-Normal and Bar in *Drosophila*.(with photographs)
 14:- Study of correlation of floral structure in insect pollinated plants. (Any two) *Salvia, Sesamum, Pisum, Plectranthus, Helianthus, Calotropis, Tridax*.

- 15:- Study of correlation of floral structure with pollination system in Castor and Maize.
- 16:- Field exploration for detection of male sterile line in Jowar/Maize.
- 17:- Demonstration of pollen fertility by using staining technique.
- 18:- Breeding technique in Brassicaceae.
- 19:- Breeding technique in Fabaceae
- 20:- Breeding technique in Malvaceae.
- 21:- Breeding technique in Poaceae.
- 22:- Camera lucida drawings (Minimum Two- Demo.)
- 23:- Measures of central tendency of given plant material.
- 24 And 25 Analysis of the given data using computer or Study of frequency distribution and its graphic representation.

Practical-IV (Based on Paper –XII and XVI)

- 1:- Qualitative tests for sugars in plant material.
- 2:- Qualitative tests for starch and cellulose .in plant material.
- 3:- Qualitative tests for proteins in plant material.
- 4:- Qualitative tests for lipids in plant material.
- 5:- Determination of isoelectric point of protein in plant material.
- 6:- Determination of fatty acid value of oil sample.
- 7 & 8 Separation of amino acids in plant extract by ascending paper chromatography.
- 9:- Estimation of proteins in plant sample by Biuret method.
- 10:- Colorimetric estimation of DNA using Diphenyl amine.
- 11:- Isolation of plant genomic DNA and its spooling.
- 12:- colorimetric estimation of RNA

- 13 and 14 Preparation of tissue culture medium (M.S) and its sterilization.
 15, 16 and 17 Demonstration of techniques of in vitro culture of various explants.
 18 to 25 Micro- technique preparation of permanent stained slides using microtome.

Solapur University, Solapur.

(Practical Question paper)

B.Sc.Part-III/Practical Examination in Botany, Mar./Apr.2015

Practical –I (Based on paper IX and XIII)

Time:-11 a.m onwards Marks: 50

Date: - Centre-

N.B.I) Do not write about points of theoretical information

Unless asked specifically.

II) Draw neat and labeled diagrams wherever necessary.

Q-1) Identify and classify the specimen A, B, C and D

Draw neat and Labeled sketches. Leave at least one slide
of each specimen for inspection.

(20)

Q-2) Isolate the fungi from the given soil sample-E.

(2)

(No Written answer)

OR

Q-2) Inoculate the given culture- E of the fungus on the
Slants of PDA. (No Written answer)

(2)

Q-3) Measure the dimensions of the given spore/pollen grain –F

Under the low and high power of Microscop Record your readings.

(2)

Q-4) Set up the experiment showing fermentation. (No written answer).

(2)

Q-5) Identifications: -

(8)

a) Identify and describe the slide/specimen-G-(Algal/fungal specimen)
and-H (Bryophytic/Pteridopytic Specimen).

(2)

b) Identify the plant diseases-I and J.Give their causal organism,
symptoms/control measures.

(2)

Q-6) a) Submission

(5)

b) Journal

(5)

Solapur University, Solapur.

(Practical Question paper)

B.Sc.Part-III/Practical Examination in Botany, Mar. /Apr.-2015

Practical –II (Based on paper X and XIV)

Time:-11 a.m onwards

Marks: 50

Date: -

Centre:-

N.B.I) Do not write about points of theoretical information
Unless asked specifically.

II) Use of Angiosperm key is allowed

III) Draw neat and labeled diagrams wherever necessary

Q-1) Identify and show the important structures observed by you
in the specimens A (by section) and B (by maceration).

Leave at least one slide of each specimen for inspection

(Gymnosperms sp.) (No written answer)

(6)

Q-2) Assign the Specimens C and D to their respective families on the basis of
vegetative and floral (reproductive) characters observed by you in them.

Draw the floral diagram of Specimen C and write the floral formula of
specimen D.

(10)

Q-3) With the help of flora, identify the genus and species of the given
specimen –E.

(5)

Q-4) Dissect the specimen F to expose the embryo. (No written answer).

(2)

OR

Q-4) Show the structure of style and stigma in the specimen F (No written
answer).

(2)

Q-5) Identifications: -

(10)

a) Identify and describe the slide/specimen-G (Gymnosperm)

(2)

b) i)-Identify and describe the specimen /slide-H (Palaeobotany)

(2)

ii) - Identify and describe the specimen /slide –I (Palaeobotany)

(2)

c) Identify and describe the specimen /slide-J (Morphology-fruit/seed
dispersal)

(2)

d) Identify and describe the slide-K (Embryology)

(2)

Q-6) a-) Tour report-----

(5)

b) Submissions-----

(5)

c) Journal

(5)

Solapur University, Solapur.

(Practical Question paper)

B.Sc.Part-III/Practical Examination in Botany, Mar/Apr.2015

Practical –III (Based on Paper No.XI and XV)

Time:-11 a.m onwards

Marks: 50

Date:-

Centre:-

N.B.I) Do not write about points of theoretical information Unless asked specifically.

II) Draw neat and labeled diagrams wherever necessary.

Q-1) Solve the given problem on Quantitative (polygene) inheritance.. (6)

Q-2) Expose the chromosomal abnormalities from the specimen-A (No written answer) (5)

Q-3)-a) Prepare the idiogram of specimen-B (5)

b) Determine the Mean, Median and Mode by using the Sample –C (5)

OR

b) Determine the frequency distribution and prepare a histogram/polygon/line graph from the specimen-C (5)

Q-4) a:-Show the breeding techniques in the given plant Material-D and E (No written answer) (8)

b:-Demonstrate the pollen fertility in the given specimen F (No written answer) (5)

Q -5) Identifications:: - (6)

a) Comment upon camera lucida (2)

b) Comment upon the floral structure and pollination Mechanism (Sp.may be given as per pract.syllabus) (2)

c) Identify and describe (Mutant types in *Drosophila*/Giant chromosome) (2)

Q -7) a:-Submissions (5)

b:-Journal (5)

Solapur University, Solapur.

(Practical Question paper)

B.Sc.Part-III/Practical Examination in Botany,Mar./Apr.2015

Practical –IV(Based on paper No XII and XVI)

Time :-11.00 a.m onwards

Marks:50

Date:-

Centre:-

N.B.I) Do not write about points of theoretical information Unless asked specifically.

II) Chart for biochemical tests is allowed.

- Q -1) Demonstrate the presence of carbohydrates/lipids/proteins by using **any two** biochemical tests from the given plant material A **(10)**
- Q- 2) Estimate the DNA from the plant material B **(10)**
- OR
- Determine the fatty acid value of oil sample –B **(10)**
- OR
- Estimate the Proteins/RNA from the sample – B **(10)**
- OR
- Separate the amino acids from the given sample/plant Material-B- by ascending paper chromatography. **(10)**
- Q- 3) Demonstrate the techniques of inoculation of Explant-C on the culture medium (no Written answer) **(9)**
- Q-4) Identifications:- **(6)**
- a) Identify and comment upon the biochemical test-D (Which is not kept above) **(3)**
- b) Identify and describe the specimen-E (DPA/cul.med/iso.ele.point/Orcinol stain) **(3)**
- Q- 5) a:-Submission and oral based on Microtomy slides. **(10)**
- b:-Journal **(5)**

Examples on Polygene Inheritance

1)- Assuming the height in a particular plant to be determined by two pairs of unlinked Polygenes. Each effective (contributing) allele contributing 5 cm to the base height of 5 cm. The cross AABB x aabb is made.

a) What height is to be expected in the F1 plants, if there is no environmental factor?

b) What is the expected phenotypic ratio in F2?

2) -In a corn, the length of ear (cob) is controlled by two independent polygenes say- A & B. The black Mexican corn with the genotype AABB having ear length 17 cm is crossed with a Tomthumpop corn variety with the genotype aabb having ear length 7 cm.

i) What will be the ear length of F1?

ii) What will be the result of F2?

iii) Give the ear length of F2?

iv) What is the contribution of each allele in the length of ear?

3) -Two races of corn averaging '28' inches & '72' inches in height respectively are crossed. The F1 is quite uniform, averaging '60' inches in height. Out of the 500 plants of F2, two are as short as '28' inches parent and two are as tall as '72' inches parent.

a) What is the no. of polygenes involved?

b) How much does each effective allele contribute to the height?

4)-In human beings, the eye colour is being controlled by the four polygenes say-A, B, C and D (no. of alleles =8).The eye colour and the no. of alleles for a particular eye colour is shown in the table below

Sr.No.	Eye colour(Phenotype)	No. of alleles	Genotypes
1	Dark brown	8	AA,BB,CC,DD
2	Medium brown	7	AA,BB,CC,Dd
1	Light brown	6	AA,BB,CC,dd
2	Hazel	5	AA,BB,Cc,dd
5	Green	2	AA,BB,cc,dd
6	Grey	1	AA,Bb,cc,dd
7	Dark blue	2	AA,bb,cc,dd
8	Medium blue	1	Aa,bb,cc,dd
9	Light blue	0	aa,bb,cc,dd

Mr.A has dark brown eyes and his wife Mrs. –B has light blue eye. Based on the hypothesis that 2 pairs of polygenes are responsible for brown eye colour. Give the genotype of Mr. and Mrs. and their child.

© Pascale's triangle may be provided for Polygene inheritance Examples.