RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

(AUTONOMOUS)

AFFILATED TO

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

B. Sc. GENERAL (SEMESTER PATTERN)

B. Sc. FIRST YEAR (CBCS)

BOTANY – CURRICULUM

UNDER ACADEMIC AUTONOMOUS STATUS 2013 -2024

(MCQ + Theory Pattern)

w. e. f. JUNE, 2021

OBJECTIVES

1. To know the importance and scope of the discipline.

2. To Inculcate interest in and love of nature with its myriad living forms.

3. To Impart knowledge of Science as the basic objective of Education.

4. To develop a scientific attitude to make students open minded, critical and curious.

5. To develop an ability to work on their own and to make them fit for the society.

6. To expose themselves to the diversity amongst life forms.

7. To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of biological materials and data.

8. To Make aware of natural resources and environment and the importance of conserving it.

9. To develop ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient.

10. To Appreciate and apply ethical principles to biological science research and studies.

11. To enable the students to face NET, SET examinations.

12. To enable the students to face MPSC, UPSC and other competitive examinations successfully.

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RAJARSHI SHAHU MAHAVIDYALAYA, LATUR
(AUTONOMOUS)
B. Sc. GENERAL (SEMESTER PATTERN)

B. Sc. FIRST YEAR (CBCS)

BOTANY – CURRICULUM

(MCQ Pattern + Theory Pattern)

Semester	Paper No. & Title	Period / practical	Marks			Credits	
			In Sem. Evaluation	End Sem. Evaluation	Total		
Semester-I	**Theory Paper-I:** Biodiversity of Cryptogams and Gymnosperms	45	20	30	50	02	
	Theory Paper-II: Cell biology and Molecular biology	45	20	30	50	02	
	Lab course -I: Practical bases on theory papers -I&II	24	--	--	50	02	
Semester-II	**Theory Paper-III:** Histology Anatomy and Embryology of Angiosperms	45	20	30	50	02	
	Theory Paper-IV: Fundamentals of Genetics	45	20	30	50	02	
	Lab course -II:-: Practical based on theory papers -III&IV	24	--	--	50	02	
					300	12	12

Workload:

1. Theory: Three Lectures / Paper / Week.

2. Practical: One practical (Three Lectures) / Batch / Week

Rajarshi Shahu Mahavidyalaya (Autonomous), Latur

B. Sc. General (Semester Pattern)

B. Sc. Second Year (CBCS)

Botany – Curriculum

(MCQ + Theory Pattern)

Semester	Paper No.	Paper Title	Course Code	Marks		Total Marks	Lectures/ Practicals	Credits
				In Sem. Evaluation	End Sem. Evaluation			
III	**V**	Morphology and Taxonomy of Angiosperms	U-BOT-367	20	30	50	45	02
	VI	Economic Botany and Pharmacognosy /NPTEL Course on Genetic Engineering	U-BOT-368	20	30	50	45	02
	Lab. Course III	Based on theory paper –V	U-BOT-369	--	--	50	24	02
	Lab. Course IV	Based on theory paper –VI	U-BOT-370	--	--	50	24	02
	SEC-I	Nursery and Floriculture	U-ADC-334N	--	50	50	45	02
IV	VII	Environmental Biology; Gardening and Land Scaping	U-BOT-467	20	30	50	45	02
	VIII	Plant Breeding and Biotechnology	U-BOT-468	20	30	50	45	02
	Lab. Course-V	Based on theory paper –VII	U-BOT-469	--	--	50	24	02
	Lab. Course-VI	Based on theory paper –VIII	U-BOT-470	--	--	50	24	02
	SEC-II	Mushroom Cultivation Techniques	U-ADC 434M	--	50	50	45	02
					Total	**500**		**20**

Workload:

1. Theory: Three Lectures / Paper / Week.

2. Practical: One practical (Three Lectures) / Batch / Week

Rajarshi Shahu Mahavidyalaya (Autonomous), Latur

B. Sc. General (Semester Pattern)

B. Sc. Third Year (CBCS)

Botany – Curriculum

(MCQ + Theory Pattern)

Semester	Paper No.	Paper Title	**Course Code**	Marks		Lectures/ Practicals	Total Marks	Credits
				In Sem. Evaluation	End Sem. Evaluation			
V	IX	Plant Physiology and Metabolism	U-BOT-583	20	30	45	50	02
	X	Plant Pathology-I/Plant Biotechnology (DSE)	U-BOT-584	20	30	45	50	02
	Lab Course-VII	Based on theory Paper – IX	U-BOT-585	--	--	24	50	02
	Lab Course-VIII	Based on theory Paper – X	U-BOT-586	--	--	24	50	02
	SEC-III	Fruits and Fruit Processing	U-ADC-540F	--	50	45	50	02
VI	XI	Plant Biochemistry and Bioinformatics	U-BOT-683	20	30	45	50	02
	XII	Plant Pathology-II / Cytogenetics (DSE)	U-BOT-684	20	30	45	50	02
	Lab Course -IX	Based on theory Paper –XI& XII	U-BOT-685	--	--	24	50	02
	Lab Course- X	Based on theory Paper –XI& XII	U-BOT-686	--	--	24	50	02
	SEC-IV	Basics in Horticulture	U-ADC-640H	--	50	45	50	02
					Total		**500**	**20**

Workload:

1. Theory: Three Lectures / Paper / Week.

2. Practical: One Practical (Three Lectures) / Batch / Week

Chairman

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

(AUTONOMOUS)

B. Sc. GENERAL (SEMESTER PATTERN)

B. Sc. FIRST YEAR (CBCS)

BOTANY – CURRICULUM

(MCQ Pattern + Theory Pattern)

Semester	Paper No. & Title	Period / practical	Marks			Credits
			In Sem. Evaluation	End Sem. Evaluation	Total	
Semester-I	**Theory Paper-I:** Biodiversity of Cryptogams and Gymnosperms	45	20	30	50	02
	Theory Paper-II: Cell biology and Molecular biology	45	20	30	50	02
	Lab course -I: Practical bases on theory papers -I&II	24	--	--	50	02
Semester-II	**Theory Paper-III:** Histology Anatomy and Embryology of Angiosperms	45	20	30	50	02
	Theory Paper-IV: Fundamentals of Genetics	45	20	30	50	02
	Lab course -II:-: Practical based on theory papers -III&IV	24	--	--	50	02
					300	12

Workload:

1. Theory: Three Lectures / Paper / Week.

2. Practical: One practical (Three Lectures) / Batch / Week

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

(AUTONOMOUS)

B. Sc. First Year
Semester – I
(MCQ + Theory Pattern)

BOTANY

Theory Paper-I: Biodiversity of Cryptogams and Gymnosperms

Periods – 45 Maximum Marks – 50 Credits-02 Course code U-BOT-159

OBJECTIVES

1. To awaken the students about microbial world and the nature of diseases of plants.
2. To understand the principles and concept in plant pathology.
3. To understand the relationships between pathogens and plants.
4. To become familiar with algae and bryophytes
5. To develop the awareness about the importance of Viruses, Bacteria, Fungi, Lichens, Algae, Bryophytes, Pteridophytes
6. To learn the life cycles of, Fungi, Lichens, Algae, Bryophytes, Pteridophytes

Course outcomes:

1) Students are able to classify microorganism on the basis of host.
2) Able to distinguish between reproductive stages of cryptogams.
3) Able to study systematic position, thallus and occurrence of algae.

UNIT – I: BACTERIA AND VIRUSES (10 L)

BACTERIA:
1. General characters.
2. Size, Shape and Ultra structure.
3. Reproduction
4. Economic importance.
VIRUSES:
1. General characters.
2. Ultra structure of TMV.
3. Economic importance.

UNIT – II: FUNGI (12 L)
1. General characters and Classification (Alexopolous and Mims, 1979).
2. Reproduction and graphic life cycle of ***Erysiphe.***
3. Economic importance.
4. Mycorhiza (General characters)
5. Lichens: General characters, Types and Economic importance.

UNIT – III: ALGAE AND BRYOPHYTES (10 L)
ALGAE:
1. General characters.
2. Classification (F.E.Fritsch, 1935).
3. Reproduction and graphic life cycle of ***Chara.***

BRYOPHYTES:
1. General characters.
2. Classification (N.S.Parihar).
3. Reproduction, and graphic life cycle of (Developmental stages not expected)
Funaria.

UNIT – IV: PTERIDOPHYTES AND GYMNOSPERMS (*13 periods)*

PTERIDOPHYTES:
1. General characters.
2. Classification (N.S.Parihar)
3. Reproduction and graphic life cycle with alternation of generations of (Developmental stages not expected) ***Nephrolepis*** **(fern).**

GYMNOSPERMS:

1. General characters.

2. Classification (Arnold, 1948).

3. Morphology of vegetative and reproductive structures (Developmental stages are not expected), and life cycle of ***Cycas.***

Reference Books:

1. Trivedi, A. N. (2002) - Advances in Pteridology
2. Bierhorst, D.W. (1971) - Morphology of Vascular plants
3. Eames, A. J. and E. M. Giffard (1950) - Comparative morphology of vascular plants.
4. Rashid, A. (1978) - An introduction to Pteridophytes.
5. Sporne, K.R. (1966) - Morphology of Pteridophytes.

6. Bower, F. O. (1963) - The Ferns.
7. Jermy, A. G. (1973) - The Phylogeny and Classification of ferns.
8. Vashishta, B.R. (1996) - Botany for degree students – Pteridophytes.
9. Parihar, N.S. (1959) - An Introduction to Pteridophyta.
10. Arnold, C.A. (1972) - An introduction to paleobotany.
11. Darroh, W.C. (1968) - Principles of paleobotany.
12. Surange, K.R. (1968) - Indian Fossil Pteridophytes.
13. Arnold, C.A. (1947): Introduction to Palaeobotany, Mc-Graw HillBook Co. Inc., New York and London.
14. Pteridophytes and Gymnosperms, springer Verlag, New York
15. Agashe, S.N. (1995), Palaeobotany, Oxford & IBH, New Delhi.
16. Biswas, C & Johri, B.N. (2004), The Gymnosperms, Narosa

Publishing House, New Delhi.Coulter J.M. & Chamberlain C.J.(1978): Morphology of

17. Gymnosperms, Central Book Depot, Allahabad.
18. Kakkar, R.K.and Kakkar, B.R. (1995), The Gymnosperms (Fossils& Living), Central Publishing House, Allahabad.
19. Sharma O.P. (2002) Gymnosperms, Pragati Prakashan, Meerut.
20. Vashishta P.C., A.R. Sinha, Anil Kumar. 2006. Gymnosperms. S.Chand.
21. Vashishta P.C. 2006. Pteridophytes. S. Chand.
22. Parihar N.S. 1996. Biology and Morphology of Pteridophytes. Central Book Depot,Allahabad.

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

(AUTONOMOUS)

B. Sc. First Year
Semester – I
(MCQ + Theory Pattern)

BOTANY

Theory Paper- II: Cell and Molecular Biology

Periods – 45 Maximum Marks – 50 Credits : 02 Course code: U-BOT-160

OBJECTIVES

1. To acquire good knowledge about cell biology
2. To acquire good knowledge about chemistry of active constituents of medicinal plants.
3. To know the techniques of Molecular biology.
4. Identification of different stages of cell division

Course outcomes

1) Students are able to karyotype and Idiogram and their significance.
2) Able to distinguish between mitotic & meiosis.
3) They are able to justify structural aspect of DNA & RNA.

UNIT –I: CELL BIOLOGY (13 L)

1. Cell: Ultra structure of Prokaryotic cell and Eukaryotic cell.
2. Structure and functions of: Cell wall and Plasma membrane.
3. **Structure and functions of cell organelles:** Nucleus, Golgi apparatus, Endoplasmic reticulum and Ribosome.

UNIT –II: CHROMOSOME (10 L)

1. Organization of Chromosome (Nucleosome Solenoid Model).
2. Morphology, structure and function of typical chromosome.
3. Types of chromosome.
5. Chromosomal Aberrations (structural and numerical).

UNIT –III: CELL DIVISION (10 L)

1. Cell cycle: Inter phase G_1 - S - G_2 –M phase and G0 phase
2. Phages and significance of Mitosis.
3. Phages and significance of Meiosis.

UNIT –IV: MOLECULAR BIOLOGY (12 L)

1. Structure of DNA (Watson and Crick model).
2. Replication of DNA.
3. Structure, function and types of RNA.
4. Protein synthesis.

Reference Books:

1. Albert's B., Bray, D., Lewis, J., Raff, M., Roberts, K. and Watson, J. D. 1989
2. Molecular biology of the Cell (2ndedition). Garland Pub. Inc., New York.
3. Karp, G. 1999. Cells and Molecular Biology: Concepts & Experiments. John Wiley and Sons, Inc., USA.
4. Lodish S, Baltimore B , Berk, C and Lawrence K, 1995 , Molecular Cell Biology ,3rd editions, Scientific American Books, N.Y
5. De Robertis and De Robertis, 1988, Cell and Molecular Biology, 8 edition, Info-Med, Hongkong.
6. Buchanan, Grissem and Jones, 2000, Biochemistry and Molecular Biology of Plants, American Soc. Plant Biologists, Waldorf
7. Lewin, B. 2000. GENE VII. Oxford University Press, New York, USA Cooper G M and Hausman R E,2007 , The Cell: Molecular Approach 4thEdn, Sinauer Associates, USA. Johnson Lewys – 2004: Cell Biology; Sarup and sons, New Delhi
8. E.J. Dupraw – 1970 : Cell and Molecular Biology; Academic Press, London
9. De Robertis and De Robertis – 1997: Cell and Molecular Biology (VIII); B.I. Waverly Pvt. Ltd., New Delhi
10. C. P. Swanson, T. Merz, and W.J. Young – 1982 : Cytogenetics ; Prentice – Hall of India Pvt. Ltd., New Delhi India
11. C. B. Powar – 1992: Cell Biology; Himalaya Publishing House.

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B. Sc. First Year
Semester – I
(MCQ + Theory Pattern)

BOTANY

Practical Paper-III: Practical based on theory papers -I&II

Periods – 45 Maximum Marks – 50 Credits-02 Course code U-BOT-161

Course outcomes

1) Students are able to identify the different microbes.
2) Students are able to identify the different types of algae, bryophyte etc.
3) Students are able to understand that the number of chromosome is characteristic of each species and can vary enormously between species.
4) Students are able to recognize that genetics is based on concept of genes as unit of inheritance.

Practical 1: Study of forms of Bacteria.

Practical 2: Study of external features of ***Chara.***

Practical 3: Study of external features of ***Erysiphe with*** classification.

Practical 4: Study of types of **Lichens (Crustose, Foliose and Fructicose).**

Practical 5: Study of external and internal features of ***Funaria.***

Practical 6: Study of external and internal features of ***Nephrolepis.***

Practical 6: Study of external, internal and reproductive features of ***Cycas.***

Practical 8: Study of cell organelles with the help of photocopies / slides

Practical 9: Study of mitosis (Onion/Garlic Root tips).

Practical 10: Study of Mitotic index (Onion/Garlic Root tips).

Practical 11-12: Study of Meiosis from onion floral buds or any other available material.

Practical 13: Study of karyotype and ideogram from photocopies of onion / Aloe plant material.

Practical 14: Botanical excursions (one short excursion is compulsory)

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B. Sc. First Year
Semester – II
BOTANY

Theory Paper-III: Histology, Anatomy and Embryology of Angiosperms

Periods – 45 Maximum Marks – 50 Credits: 02 Course code: U-BOT-260

OBJECTIVES

1. To awaken the students about Tissue system of of plants.
2. To understand the process and concepts in plant Embryology.
3. To understand the relationships between pathogens and plants.
4. To become familiar with histology and anatomy of plants
5. To learn the internal structures of plant organs.

Course outcomes:

1) Able to differentiate various tissues.
2) They are able to perform sectioning of various ovules.
3) Developed approach for embryology study.

UNIT – I: HISTOLOGY

Plant Tissues (12 L)

A. Meristematic tissues and their classification based on position

B.Permanent Tissues

I Simple Tissues:

1. Parenchyma
2. Collenchyma
3. Sclerenchyma

II Complex Tissues

1. Xylem
2. Phloem

III Secretary Tissues

1. Laticiferous Tissues

Ex. Latex cells

2. Glandular Tissues

a. External glands

Ex. Digestive glands

b. Internal glands

Ex. Oil glands

UNIT – II: ANATOMY (12 periods)

1. Anatomy of dicot Stem (Sunflower).
2. Anatomy of monocot Stem (Maize).
3. Secondary growth in dicot stem.
4. Leaf anatomy of dicotyledons (Sunflower) and monocotyledons (Maize).
5. Anomalous secondary growth in *Dracaena* stem.

UNIT –III: EMBRYOLOGY –I (11 periods)

1 Structure of a Microsporangium (T.S. of anther)**.**
2. Structure of a Microspore.
3. Development of male gametophyte (Microgametogenesis).
4. Structure of a Megasporangium.
5. Anatropous ovule
6. Types of ovule.
7. Development of female gametophyte (Monosporic).

UNIT – IV: EMBRYOLOGY –II (10 L)

1. Fertilization.
2. Post fertilization changes.
3. Endosperm and its types.
4. Development of dicot embryo (Crucifer type).
5. Structure of Dicot seed.
6. Structure of Monocot seed.

References:

1. **Briggs David 2009.** *Plant microevolution and Conservation in Human-influenced*
2. *Ecosystems*.Cambridge University Press.
3. **Cronquist, A. 1981.***An Integrated System of Classification of Flowering Plants*
4. Columbia University Press, New York.
5. **Cronquist, A. 1988**.*The Evolution and Classification of Flowering Plants* (2nded.) Allen
6. Press, U.S.A.
7. **Davis, P. H. and V. H. Heywood 1991**.*Principles of Angiosperm Taxonomy***.**Today and
8. Tomorrow Publications, New Delhi.
9. **Hutchinson, J. 1959.***Families of Flowering plants.*
10. **Judd W. S., Campbell, C. S., Kellogg, E. A., Stevens P. F. and M. J. Donoghue**

11. **2008.***Plant Systematics: A phylogenetic Approach.*Sunderland, Massachusetts,
12. USA.
13. **Lawrence George H. M. 195.1** *Taxonomy of Vascular Plants.*Oxford and IBH Publ. Co.
14. Pvt. Ltd. New Delhi.
15. **Leadlay E. and S. Jury (ed.) 2006.***Taxonomy and Plant conservation.*Cambridge
16. University Press.
17. **Manilal, K. S. and M. S. Muktesh Kumar [ed.] 1998.***A Handbook of Taxonomic*
18. *Training.* DST, New Delhi.
19. **Naik, V. N. 1984.***Taxonomy of Angiosperms*. Tata McGraw-Hill Publication Com. Ltd.
20. New Delhi
21. **Quicke, Donald, L. J. 1993.***Principles and Techniques of Contemporary*
22. *Taxonomy.*Blakie Academic & Professional, London
23. **Takhtajan, A. 1962.***Flowering plants- Origin and Dispersal.*
24. **Taylor, D. V. and L. J. Hickey 1997.** *Flowering Plants: Origin, Evolution and*
25. *Phylogeny.***.**CBS Publishers & Distributers, New Delhi.

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

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B. Sc. First Year

Semester – II

BOTANY

Theory Paper-V: Fundamentals of Genetics

Periods – 45 Maximum Marks – 50 Credits: 02 Course code: U-BOT-261

1. To awaken the students about genetic terms
2. To understand the principles of genetics and laws of inheritance.
3. To understand the relationships between epistatic and non epistatic genes.
4. To develop the awareness about genetic disorders

Course outcomes:

1) Developed understanding about inheritance Biology.
2) Solved problems independently on Genetic disorder.
3) Able to understood Gene related diseases & its control.

UNIT –I: MENDELISM (10 L)

1. Mendel's experiments (biography)
2. Genetic terminologies
3. Explanation and examples of (monohybrid cross, dihybrid cross and back cross and test cross)
4. Mendel's Laws of Inheritance.

UNIT –II: GENE INTERACTIONS (12 L)

A. Allelic interactions: Explanation and examples of Incomplete dominance, Co- dominance (4 '0'clock plant inheritance of coat color in cattle)

B. Non-Allelic interactions

I. Epistatic: Explanation and examples of
   a. Dominant epistasis - 12:3:1
   b. Recessive epistasis - 9:3:4 (Supplementary gene)
   c. Duplicate dominant epistasis - 15:1
   d. Duplicate recessive epistasis - 9:7 (Complementary gene)

II. Non-epistatic: Explanation and examples of
   a. Collaborator gene - 9:3:3:1 (Comb shape in fowl)

UNIT –III: SEX DETERMINATION: (11 L)

1. Sex determination: Discovery of sex chromosomes,

2. Chromosomal theory of sex determination.
- **i.** Sex determination in Animals (XX,XY) (Drosophila)
- **ii.** Sex determination in insects (XO-XX),
- **iii.** Sex determination in Birds (ZW-ZZ method),
- **iv.** Sex determination in Plants (*Asparagus*).

3. Linkage: Definitions, significance, Coupling and repulsion hypothesis.

UNIT –IV: SEX LINKED INHERITANCE: (12 L)

1. Sex linked inheritance: Definition classification (x-linked, y-linked and xy-linked)

a) Sex linked inheritance in Drosophila (White eye colour)

b) Sex linked inheritance in Man (Hemophilia, colour blindness and hypertrochosis

c) Inheritance bobbed bristles in Drosophila

2. Gene related diseases: Phenylketonuria (PKU), Alkaptonuria (AKU) and Albinism.

3. Syndromes in Man (Autosomal and sex - chromosomal syndromes).

i) Down's syndrome

ii) Klinfelter's Syndrome.

References:

1. Alberts, B. Bray, D. Lewis, J. Raff, M. Roberts, K. and Watson, J. D. I989. Molecular Biology (Ed.) Garland Publishing Inc. New York.
2. Atherly, A. G., Girton, J. R. and McDonald, J. F. 1999. The Science of Genetics. Saunders College USA.
3. Burnham, C. R. 1962. Discussions in Cytogenetics, Burgess Publishing Co., Minnesota.
4. Busch. H. and Rothblum, L. 1982 Volume X. The cell nucleus: DNA part A, Academic Press.
5. Hartl, D. L. and Jones E. W. 1998. Genetics: Principles and Analysis (4ih Ed.)
6. Jones and Barew Publishers, Massachusetts, USA.
7. Khush, G. S. 1973. Cytogenetics of Aneuploids, Academic Press, New York, London.
8. Karp, G. 1999. Cell and Molecular Biology; Concepts and Experiments, John Wiley and Sons Inc. USA.

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(AUTONOMOUS)

B. Sc. First Year
Semester – II
BOTANY

Practical Paper-VI: Practical based on theory papers - IV& V

Periods – 45 Maximum Marks – 50 Credits: 02 Course code: U-BOT-262

Course outcomes

1) Students are able to stand in clinic as genetics services.
2) Students identify the different types of genetics disorder.
3) Students Prepare independently permanent slides.

Practical 1: Study of permanent tissues (Mechanical and Complex) with the help of Permanent slides/models/ Charts/photocopies.

Practical 2: Study of T.S. of Anther and types of ovule with the help of Permanent slides/models/ charts/photocopies.

Practical 3: Preparation of double stained permanent slides of Sunflower Stem.

Practical 4: Preparation of double stained permanent slides of Maize Stem.

Practical 5-10: Problems based on monohybrid/Dihybrid ratio; 9:7//12:3:1/15:1 and collaborator gene.

Practical 11-12: Problems based on sex-linked inheritance.

Practical 13-14: Botanical excursions (one long excursion is compulsory)

SKELETON OF QUESTION PAPER
B. Sc. First Year

Semester – I & II

Theory Paper-I, II, III and IV

Time*: 1.30 hours* ***Maximum Marks: 30***

Note: (i) Attempt all questions.
(ii) Draw neat and well labeled diagrams wherever necessary.

Q1. Attempt all of the following (Each 3 marks) **12**

a)
b)
c)
d)

Q2. Attempt any ONE of the following **08**

a)
b)

Q3. Attempt any ONE of the following **10**

a)
b)

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

(Autonomous)

B.Sc.I PRACTICAL EXAMINATION IN BOTANY

SEE WINTER/SUMMER

Time: Three Hours ***Maximum Marks: 30***

Note: - (i) Attempt all questions.

(ii) Draw neat and well labeled diagrams wherever necessary.

Q. 1. Long answer type question. 10

Q. 2. Long answer type question. 10

Q. 3. Spotting: (02 spots) 05

Q. 4. Viva- Voce. 05

S.N.Shinde
Chairman
Board of Studies in Botany
Rajarshi Shahu Mahavidyalaya (Autonomous),
Latur

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