



**Maharaja Surajmal Brij University**

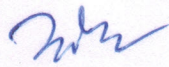
**Bharatpur (Raj.)**

**SYLLABUS**

**B.Sc. Part I, II, III**

**BOTANY**

**Only For Session  
2020-21**

  
**अकादमिक प्रभारी**  
**महाराजा सूरजमल बृज विश्वविद्यालय**  
**भरतपुर (राज.)**

**Skeleton Paper**  
**M.Sc. (F) Papers VII, VIII, IX & X**  
**General Practical**

Time - 8 Hrs

M.M. = 200

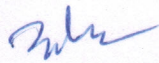
Min. Marks = 72

Q.No.

Mark Allotted

- |        |  |    |
|--------|--|----|
| 1. (a) | Make suitable preparation of the given material. Draw labeled diagram, and Study the anatomical features with special reference to its vascular structure. Discuss points of special interest. | 14 |
| (b)    | With the help of suitable preparation study the floral/seedcoat / epidermal/ Micro-sporangium wall structure of the material provided. Draw labeled Diagram and comment upon its features.     | 14 |
| 2. (a) | Identify any two.....materials from the given samples. Give economic importance With special reference to origin, cultivation, part used and processing, if any.                               | 14 |
| (b)    | Mark the highest yield producing areas in the map provided to you.   | 12 |
| 3. (a) | Perform the given Ecological exercise.   | 14 |
| (b)    | Perform the given Ecological exercise.   | 14 |
| 4. (a) | Perform biotechnological exercise given to you.  | 14 |
| (b)    | Write details about the exercise given to you.   | 10 |
| 5.     | Sports 1 to 8  | 24 |
| 6.     | Records  | 30 |
| 7.     | Viva-Voce  | 20 |
| 8.     | Sessional  | 20 |

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**Practical Examination**  
**Second Day (4 Hrs)**  
**Practical Special Paper Advance Plant Pathology**  
**(Paper-XIA & XII A)**

Time - 4 Hrs

M.M. = 100

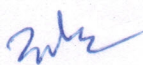
Min. Marks = 36

Q.No.

Mark Allotted

1. Study the histopathology of the material 'A'. Make suitable preparation of the given material. Assign symptoms, causal organism and identify the disease making pathological 10 note of the given material.
2. Calibrate your microscope. Find out the average size of the fungal spore given to you  
OR  
Draw the camera-lucida drawing of the given material.
3. Study the given material
4. Make a comparative phylo-pathological note on the material "C" and "B" 10
5. Study the histopathology of the material "E" write points of special interest. 10
6. Prepare a Bacterial preparation of the given material "F" using Gram Staining. Write and conclude about the result. 10
7. Comment up on the 1 to 5 10
8. Viva-Voce 10
9. Records 15
10. Sessional 10

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**Skeleton Paper**  
**M.Sc. (F) Practical Examination**  
**Special Paper – Ecosystem Ecology and**  
**Environments Biology - XI (C) and XII (C):**

Time - 4 Hrs

M.M. = 100

Min. Marks = 36

Q.No.

Mark Allotted

1. Determine organic matter content of the given soil sample by Walkely & Black method 20

Or

- Determine the dissolved O<sub>2</sub> in a given water body by Winkler iodometric method.
2. Prepare the glycerin mount of the given plant materials explaining their anatomical adaptations in relation to habitat. 20

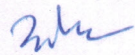
Or

- Study the various types of trichomes and their rolling mechanism to withstand during drought of given plant material.
3. Determine the total hardness Co<sub>2</sub>/Cl of the given water sample. 10
4. Determine pH of the given soil sample by pH meter. 05

Or

- Determine the conductivity of the given soil sample.
5. Comment upon the spots (1-5) 10
6. Practical Record 15
7. Viva-Voce 10
8. Sessional 10

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**B.Sc. Part-I  
BOTANY**

**Scheme:**

**Max Mark: 100**

**Min. Pass Marks: 36**

Paper - I	3 Hrs duration	33 Marks
Paper - II	3 Hrs duration	33 Marks
Paper - III	3 Hrs duration	34 Marks
Practicals	4 Hrs duration	50 Marks
Duration of examination of each theory paper		3 hours
Duration of examination of practicals		4 hours

**Note:**

1. There will be 5 questions in each paper . All questions are compulsory. Candidate has to answer all questions in the main answer book only
2. Q.No. 1 will have 20 very short answer type Questions (not more than 20 words) of half marks each covering entire syllabus.
3. Each paper is divided into four units. There will be one question from each unit. These Q.No. 2 to 5 will have internal choice.

**B.Sc. Part 1**

**Paper-I**

**ALGAE, LICHEN AND BRYOPHYTA**

**Unit-1**

General characters, Diverse Habitat. Range of thallus structure, Photosynthetic pigments and Food reserves. Reproduction (Vegetative, Asexual, Sexual), Types of life cycles: Economic Importance.

**Unit-2**

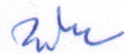
**Type Studies**

Cyanophyceae - Oscillatoria  
Chlorophyceae- Volvox, Chara.  
Xanthophyceae  
Phaeophyceae - Ectocarpus.  
Rhodophyceae- Polysiphonia.

**Unit-3**

General characters, Habitat, Range of thallus structure. Reproduction (Vegetative and Sexual); Alternation of generations; Economic importance.

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#### Unit-4

##### Type Studies

Hepaticopsida - Marchantia.

Anthocerotopsida - Anthoceros.

Bryopsida - Funaria

Lichens- General characters, Habitat, Structure, Reproduction, Economic and Ecological importance of Lichens.

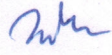
##### Suggested Laboratory Exercises :

1. Study of class material by making suitable temporary slides and study of permanent slides of, Oscillatoria, Nostoc, Volvox, Oedogonium, Chara, Vaucheria, Ectocarpus, Polysiphonia.
2. Study of external morphology and preparation of suitable sections of vegetative/reproductive parts of Riccia, Marchantia, Anthoceros, Funaria.
3. Study of lichens.

##### Suggested Readings :

1. Bold.H.C. Alexopoulos. C.J. and Delivoryas, T Morphology of Plant and Fungi (4th Ed.) Harper & Foul Co, New work, 1980.
2. Ghemawat, M.S. Kapoor, J.N. and Narayan, H.S. A text Book of Algae, Ramesh Book Depot, Jaipur, 1976.
3. Gilbert, M; Smith. Cryptogamic Botany, Vol. I & II (2nd Ed.) Tata McGraw Hill. Publishing Co., Ltd., New Delhi, 1985.
4. Kumar, H.D. : Introductory Phycology, Affiliated East-West Press, Ltd. New York, 1988.
5. Puri. P.: Bryophytes, Atmaram & Sons, Delhi, Lucknow, 1985.
6. Sarabhai. R.C. and Saxana, R.C. : A text book of Botany. Vol I & II, Ratan Prakashan Mandir, Meerut, 1980.
7. Singh, V., Pande, P.C. and Jain, D.K.: A text book of Botany, Rastogi, & Co., Meerut, 2001.
8. Vashista, B.R.: Botany for Degree Students ( Algae, Bryophytes) S.Chand & Co., New Delhi, 2002.

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**Paper II**  
**Microbiology, Mycology and Plant Pathology**

**Unit-I**

Microbiology: Meaning and scope,

Eubacteria: General account, occurrence, morphology (structured and shapes), flagella, capsule, nutritional types. endospore, reproduction (binary fission, transformation, conjugation, transduction), economic and biological importance.

Mycoplasma and Phytoplasma: occurrence, morphology, reproduction and importance.

Virus: General characteristics and importance. Structure of TMV and Pox virus.

**Unit-II**

Fungi: General characters, occurrence, thallus organization, reproduction, economic importance.

Brief account, structure, importance and life history and/or disease cycle and control of the following:

Albugo and white rust; Sclerospora and Downy mildew/Green ear disease of Bajra; Aspergillus, Peziza.

**Unit - III**

Brief account, structure, importance and life history and/or disease cycle and control of the following:

Puccinia and Black rust of wheat: loose smut of wheat and covered smut of barley; Alternaria and early blight of potato.

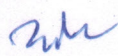
**Unit-IV**

Causes and symptoms of plant diseases with special reference to green ear disease of Bajra, smut of wheat, citrus canker, little leaf of brinjal.

**Suggested Laboratory Exercises:**

1. Study of bacteria using curd or any other suitable material, Gram's staining of bacteria.
2. Study of Mycoplasma, TMV, bacteriophage (Photographs/3-D models).
3. Study of symptoms of plant diseases- Downy mildew of Bajra, Green ear of bajra, Powdery mildew.
4. Study of specimen, permanent slides and by making suitable temporary slides. Albugo white rust; Sclerospora-downy mildew, green ear; Aspergillus; Claviceps- ergot; Peziza, Ustilago-Loose smut of wheat, covered smut of barley, Puccinia- Black rust of wheat: Agaricus and Alternaria- early blight of potato.
5. Media preparation: potato dextrose agar, Nutrient agar.
6. Culture techniques of fungi and bacteria.

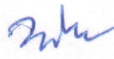
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**Suggested Books:**

- Alexopoulos, C.J. and Mims, C.W. : Introductory Mycology, John Wiley and Sons, New York, 2000.
- Dube, H.C.:Fungi, Rastogi Publication, Meerut, 1989.
- Sarabhai, R.C. and Saxena, R.C.: A Text book of Botany, Rastogi Publication, Meerut, 1990.
- Sharma, O.P: Fungi, Today and Tomorrow Printers and Publishers, New Delhi, 2000.
- Vashihsta. B.R. Botany for degree students- Fungi, S.Chand & Co. New Delhi, 2001.
- Bilgrami, K.S. and Dube, H.C.: A Text book of modern plant Pathology, Vikas Publications, New Delhi 2000.
- Biswas, S.B. and Biswasa: An Introduction to Viruses, Vikas Publications, New Delhi 2000
- Clifton, A.: Introduction of Bacteria, McGraw Hill co. Ltd., New York, 1985.
- Madahar. C.L.. Introduction of Plants Virus. S.Chand and Co., New Delhi. 1978.
- Palzar M.J. Jr. Chan, E.C.S. and Krieg, N.R.: Microbiology, McGraw hill Edu. Pvt. Ltd., London 2001.
- Purohit, S.S : Microbiology, Agro. Bot. Publication, Jodhpur 2002.
- Sharma, P.D. : Microbiology and Pathology, Rastogi Publication, Meerut, 2003.
- Singh. V. and Srivastava V. : Introduction of Bacteria. Vikas Publication, 1998.
- Cappuccino, J. and Sherman, N.: Microbiology: A Laboratory Manual (10 Th Ed.), Benjamin Cummings, 2013
- Aneja. K.R. Experiments in Microbiology, Plant Pathology and Biotechnology New age International (P) Ltd., Publishers, New Delhi 2003.
- Mehrotra, R.S. and Aggarwal, Ashok: Plant Pathology, Tata McGraw-Hill Education, 2003.

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**B.Sc. Part-I**  
**BOTANY: PAPER III- CELL BIOLOGY, GENETICS AND**  
**PLANT BREEDING**

**Unit 1: Cell organelles and Nuclear material:**

Ultrastructure and function of different cell organelles (cell wall, plasma membrane, nucleus, mitochondria, chloroplast, ribosome). Chromatin structure and chromosome organisation: eukaryotic and prokaryotic, Transposons.

**Unit-2: Cell divisions**

**Cell Cycle, Mitosis:** stages, structure and functions of spindle apparatus, anaphasic chromosome movement; Meiosis: its different stages- meiosis I, meiosis II, synaptonemal complex.

**Basis of genetic material:** Griffith's transformation experiment and the Hershey and Chase blender experiment to demonstrate DNA as the genetic material.

**Extra nuclear genome:** Mitochondrial and chloroplast genome, plasmids.

**Chromosomal aberrations:** Deletion, Duplication, Translocation, Inversion, Aneuploidy and Polyploidy.

**Unit-3: Genetic Inheritance**

Mendel's laws of inheritance and their exceptions: allelic ( incomplete and co-dominance, lethality) and non-allelic interactions complementary genes, epistasis and duplicate genes).

**Cytoplasmic inheritance:** Maternal influence, shell coiling in snails.


**Unit-4: Plant Breeding**

Introduction and objectives of plant breeding, general methods of plant breeding- in self-pollinated, cross-pollinated and vegetatively propagated crop plants. Introduction and acclimatization, selections, hybridizations, hybrid vigour and inbreeding depression. Role of mutation and polyploidy in plant breeding. Famous Indian and international plant breeders and their contribution.

**Suggested Laboratory Exercises:**

- Study of cell structure from Onion, Hydrilla and Spirogyra
- Study of cyclosis in Tradescantia spp.
- Study of plastid for pigment distribution in Lycopersicon, Cassia and Capsicum.
- Study of electron microphotographs of eukaryotic cells for various cell organelles.
- Study of electron microphotographs of virus, bacteria and eukaryotic cells for comparative study of cellular organization.
- Study of different stages of mitosis and meiosis in root-tip cells and flower buds respectively of onion.

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- To solve genetic problems based upon Mendel's Laws of inheritance: Monohybrid, Dihybrid, Back cross and Test cross.
- Permanent slides/Photographs of different stages of mitosis and meiosis, sex chromosomes, polytene chromosome and salivary gland chromosomes.
- Emasculation, bagging & Tagging techniques.
- Cross pollination Techniques.

**Suggested Readings:**

- Choudhary, H.K. (1989), Elementary Principles of Plant Breeding. Oxford and IBM Publishing Co, New Delhi.
- Gupta. P.K. (2009) Cytology, Genetics Evolution and Plant Breeding, Rastogi Publications, Meerut.
- Miglani, GS (2000), Advanced Genetics, Narosa Publishing House, New Delhi.
- Russel, P.I.(1998). Genetics The Benjamins/Cummings Publishing Co., Inc. U.S.A.
- Shukla, R.S and chandel, P.S. (2000) Cytogenetics, Evolution and Plant Breeding, S.Chand & Co. Ltd. New Delhi.
- Singh, R.B.(1999), Text Book of Plant Breeding, Kalyani Publishers, Ludhiana.
- Dnyansagar. VR. (1986). Cytology and Genetics, Tata McGraw Hill Pub. Co. Ltd. New.
- Roy.SC. and De. KK. (1999) Cell Biology. New Central Book Agency (P)Ltd.Calcutta.
- Verma. PS and Agarwal, VK (2012) Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S.Chand and Co. Ltd. New Delhi.

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