SOLAPUR UNIVERSITY, SOLAPUR.

Draft Syllabus of B.Sc.Part-I (Botany) Semester system.

(With effect from June-2013)

1) Title of the course: B.Sc.Part I/Botany.Semester I and II.

2) Introduction:-Botany is a separate Paper introduced at B. Sc. Part –I, which is a part/Section of Biology Paper at jr.level. This paper deals with the topics like- Plant diversity, Classification of Plant kingdom, Non Vascular plants & Plant Pathology, Plant Biochemistry and Horticulture Vascular plants, Cell Biology and Plant Biotechnology. This one of the basic subjects of life sciences which provides the basic knowledge for the applied subjects like Bioinformatics, Biotechnology, ecology, Agroforestry, Environmental studies, Genetic engineering etc.The students become prepared for the competitive exam. at National and state level.

3) Objectives of the course:-

i)To promote the students to the various disciplines of Botany.

ii)To assist the students to understand the life cycle,physiology,cytology,Hoticulture,Biochemistry,Biodivetsity of the plants.

iii) To enhance the Practical knowledge of the students of the subject.

iv) To create research attitudes among the students.

v) To create the awareness about the contribution of Botany to the society.

4) Advantage of the Course:-

i) Student after passing B.Sc.with Botany as a principal subject become eligible for M.Sc.-Botany,Biotechnology,Bioinformatics,Genetic engineering, Forestry etc.

ii) Can appear for Competitive Exam.-Range Forest officer, Divisional Forest Officer, Indian forest service Exam. MPDC, UPSC etc.

iii) Can get jobs in Different industries- Hybrid seeds coy/Research centre, Fertilizer coy. Etc.

iv) Can update the knowledge of Life science.

v) Can help in environment Protection and conservation.

5) Eligibility:-XIIth Science pass. XII th MCVC PASS with one of the Agri.Subject.

6) Duration: - The entire B.Sc. course is for Three years but the B Sc. Part-I is of one year duration with Semester I and II.

7) Medium of Instruction: - English.

8) Structure of the Course:- B.Sc Part –I Comprises four theory papers to be studied in two semester carrying 50 marks each and one practical course including 26 practicals,carrying 50 marks. The practical examination is to be conducted at the end of semester II and Annually.

A) Semester-I

Theory Paper-I. Plant diversity, Classification of Plant kingdom, Non Vascular plants & Plant Pathology, 50 Marks

Theory Paper –II. Plant Biochemistry and Horticulture. 50 Marks

B) Semester-II.

Theory Paper-III. Vascular plants. 50 Marks

Theory Paper-IV. Cell Biology and Plant Biotechnology. 50 Marks

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C) Practical Course:- 50 Marks

The practical course is to be covered in twenty-six practicals and will be based on paper no I, II III and IV. The practical examination of 50 marks will be based on the above practical course and will be conducted at the end of second semester.

9) Equivalence of the Revised and Pre revised papers:-

Sr.No	Pre-revised	Marks	Re-vised	Marks
	Semester –I			
1	**Paper-I**	50	Paper –I	**50**
2	**Paper-II**	50	Paper-II	**50**
	Semester-II			
3	**Paper –III**	50	Paper -III	**50**
4	**Paper- IV**	50	Paper- IV	**50**
5	**Practical –(Annual)**	50	**Practical –(Annual)**	**50**

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Syllabus of B.Sc. Part – I (Botany) Semester System

(With effect from June2013)

Semester – I

Paper – I **50 Marks**

(Plant diversity, Classification of Plant kingdom Non-Vascular Plants and Plant Pathology)

1. Introduction to plant diversity **(05)**

1.1 What is plant diversity?

1.2 Why to study plant diversity? (Importance / Value)

1.3 Different aspects of diversity in lower plants with respect to –
a. Habitat, b. Form c. Nutrition

2. Cryptogams: **(02)**

2.1 Introduction.

2.2 General characters.

2.3 Classification according to G.M. Smith up to Class.

3. Algae: **(08)**

3.1 Introduction

3.2 General characters and classification (According to G. M. Smith) 02

3.3 Study of Spirogyra -
Systematic position with reasons, Habit and Habitat, Structure of thallus, Structure of typical cell, Reproduction – Vegetative and Sexual, Alternation of generation 02

3.4 Study of Sargassum –
Systematic position with reasons, Habit and Habitat, External and Internal structure, Reproduction – Vegetative and Sexual (Development of

Conceptacles and sex organs not expected), Alternation of generations. 03

3.5 Brief account of economic importance of algae – 01

4 Fungi (07)

4.1 Introduction

4.2 General characters and classification (According toAinsworth)

4.3 Study of Mucor –

Systematic position with reasons, Occurrence, Structure of mycelium, Nutrition, Reproduction – Vegetative, Asexual and Sexual. 03

4.4 Study of *Puccinia graminis tritici* (Wheat rust)

Systematic position with reasons, Occurrence, Structure of mycelium, Nutrition, Reproduction 03

4.5 Brief account of economic importance of fungi 01

5. Bryophytes (05)

5.1 Introduction

5.2 General characters and Classification (According to G.M. Smith) 01

5.3 Study of *Riccia* –

Systematic position with reasons, Habit and Habitat, External and Internal structure of thallus (gametophyte), and Reproduction (Development of Sex organs not expected), Alternation of generations. 03

5.4 Economic importance of Bryophytes 01

6. Plant Pathology (08)

6.1 Introduction

6.2 Study of following diseases with respect to Host, Pathogen, Symptoms and Management/Control measures.

a. Little leaf of Brinjal 02
b. Yellow vein mosaic of Bhendi 02
c. Citrus canker 02
d. Grain smut of Jowar 02

Reference Books

1. Algae -Kumar H.D.and H.N.Singh (1991)
2. Algae -Sharma C.P. (1986)
3. Algae -Pandey B.P. (1994)
4. Algae -Vashishta B.R. (1994).
5. Algae -Venkatam et.al. (1974)
6. Botany for Degree students-Algae-B.R.Vashishta.
7. Cryptogrammic Botany-Smith G.M. (1973) Vol. –I and Vol. –II
8. Introduction to fungi –Dube H.C. (1990).Vikas publishing House Ltd.Delhi.
9. The Fungi-Mehra B.S. (1967).Int.pub.Allahabad.
10. Introductory Mycology –Alexopoulos C.J. and C.W.Mims. (1962)
11. Text book of fungi –Sharma C.P. (1989)
12. Fungi –Pandey B.P (1994).
13. Biology of Lichens –Hale I.E. (1967) Edward Arnold, London.
14. Interrelationship of Bryophytes -1964-Cavers F.
15. Bryophytes –Kumar H.D. (Atmaram &Sons).
16. Botany for Degree students –Bryophyte- B.R.Vashishta.S.Chand Company.
17. Plant diseases –Singh R.S. (1963).
18. Manual of plant pathology –Padoley S.K. & Mistry P.B.
19. Hand book of field crop diseases-Ny.Vall (1979).
20. Experiments in Microbiology, Plant pathology and Tissue culture-Aneja K.R. (1993).
21. Clinical plant pathology –Gangopadhyay (1984).
    Hill publishing company Ltd –New Delhi.
    University, Kurukshetra.
22. Plant Diseases- F.T. Brooks, periodical Expert book Agency, D-42, Vivek Vihar, Delhi 1100032.
23. Plant diseases –Rajani shrma, Campus books international, 4831/24 prahlad Street, An sari Road, Daryaganj, New Dehli-110002.
24. Diseases of crop plant in India –Dr.Rangaswami.
25 Plant diseases –R.S. Singh
26 Modern plant pathology – R. S. Bilgrami and H.C.Dube
And Company Limited, Ramnagar New Delhi.
27. Botany for Degree students- Algae- B.R.Vasistha.

28. Botany for Degree students- Bryophytes- B.R.Vasistha.
29. Botany for Degree students- Fungi - B.R.Vasistha. ,-S.Chand and Company
13. Biology of Lichens –Hale I.E. (1967) Edward Arnold, London.

Semester-I

Paper-II (Plant Biochemistry and Horticulture.)

1.	**Introduction to Plant Biochemistry**	**(2)**
1.1	Cell as a biochemical entity	02
2.	**Cell chemistry**	**(08)**
2.1	Structure, Properties and Biological significance of water	02
2.2	pH– pH scale, Significance of pH,	02
2.3	Buffers - Inorganic and Organic buffers and their significance	02
2.4	ATP – Structure and functions.	02
3	**Enzymology**	**(7)**
3.1	Classification and Nomenclature of enzymes	02
3.2	Physicochemical properties of enzymes, Co-factors, Coenzymes and Isozymes	03
3.3	Mechanism of enzyme action	02
4.	**Horticulture**	**(02)**
4.1	Introduction	
4.2	Definition	
4.3	Scope and Importance	
4.4	Export potential	
5.0	**Branches of Horticulture**	**(03)**
	(Definition and description of the Following branches)	
5.1	Pomoculture	
5.2	Olericulture	
5.3	Floriculture	
5.4	Ornamental and landscape gardening	**(03)**

6. Propagation of horticultural plants. (13)

6.1 Sexual methods (seed propagation) – Definition, Criteria for selection of seeds, Merits and Demerits. 03

6.2 Vegetative propagation – Definition, Types- Natural and Artificial 01

6.3 Natural methods of vegetative propagation 01

i) Definition

ii) Runners, Suckers, Bulbs, Tubers, Rhizomes, Bulbils, Stolons and Offsets.

iii) Merits and demerits of vegetative propagation

6.4 Propagation by artificial methods

i) Cuttings – Definition, Types (listing), Stem cutting – Soft wood, Semi hard wood and Hardwood cuttings 02

ii) Layering – Definition, Types (listing), Simple, Air layering 02

iii) Grafting – Definition, Stock and scion relationship, Types (listing), Whip and Approach Grafting 02

iv) Budding – Definition, Types – "T" and Patch budding 02

Reference Books

01. Experimental Biochemistry-Dryer R.L.and Lata G.G.(1989).
02. A. Biologist guide to principles and techniques of practical Biochemistry-Wilsond and Goulding K.H. (1996)
03. Principles of biochemistry-Conan and Smmpff, John and Wiley (2000).
04. Cell- Physiology and Biochemistry –Me.Elory, Prentice Hall (1972).
05. Plant Biochemistry-Cell-Sumps P.K. and Connie's. (1981).
06. Biochemistry-Campbell M.K.(1999).Publ.Saunders College Publishing,U.S.A.
07. Principles of Biochemistry-Nelson D.L. and Cox. M.M.(2000),Worth publisher, New York.
08. Biochemistry –Rawh D.L. (1989), Neil Pattersoh Publisher U.S.A.
09. Biochemistry-Zubay G. (1993), WCB, publisher, Lowa U.S.A.

10. Fundamentals of Horticulture –J.B.Edmond and J.L.Senn, Tata McGraw Hill publishing company Ltd –New Delhi.
11. Advances in Horticulture and Forestry –S.P.Singh., Science publishers, SA, New Pali Road, No.91, Jodhpur-342001.
12. Manula of Gardening –W.Burns (Edn)-Saeed International (Regd.) E-9-Jungpura (Extn).New Delhi-110014.
13. Gardening of India-T.K.Bose and D.Mukhargee, Oxford and IBH-publishing Co.Pvt.Ltd.Culcutta.
14. The culture of Vegetables and flowers-Martin-Sutton-Ambey-publications Delhi.
15. PlantPropagation-M.K.Sadhi,WileyEasternLimited,4835/29,Ansari Road, Daryaganj, New Delhi -110002.
16. Text book of Horticulture and Gardening-Dr.M.R.Khan. Publishing Co.Pvt.Ltd.Culkatta/New Delhi.
17. A text book of a plant physiology and Biochemistry –S.K.Verma., S.Chand And Company Limited, Ramnagar New Delhi.

Semester-II

Paper-III. (Vascular Plants) 50 Marks

1. Pteridophytes (07)

1.1 Introduction

1.2 General characters and classification up to class (According to G.M. Smith) 01

1.3 Study of Selaginella – 05

Systematic position with reasons, Habit and Habitat, External morphology of sporophyte, Anatomy of stem and Reproduction, (Development of sex organs and embryo not expected), Alternation of generations.

1.4 Economic importance of Pteridophytes 01

2. Gymnosperms (09)

2.1 Introduction

2.2 General characters and classification up to orders (According to Sporne1965) **02**

2.3 Study of Cycas with respect to **06**

Distribution, Systematic position with reasons, External morphology of sporophyte, anatomy of leaflet and coralloid root,

Reproductive structure – structure of male cone and microsporophyll, Structure of megasporophyll and ovule (L. S.)

2.4 Brief account of economic importance of Gymnosperms. **01**

3. Angiosperms (19)

3.1 Introduction

3.2 Salient features and diversity 02

3.3 Outline of Bentham and Hooker's system of classification, Merits and Demerits 02

3.4 Salient features of International Code of Botanical Nomenclature (ICBN) 02

3.5 General account of morphology with respect to inflorescence, flower, fruit, Concept of floral formula and floral diagram. 09

3.6 Study of families of angiosperms – Systematic position, General account 04

Of the following families with respect to diagnostic features and economic importance

i) Caesalpinaceae ii) Apocynaceae

iii) Nyctaginaceae IV) Amaryllidaceae

Reference Books

01. The Ferns -Bower F.O. (1963).
02. Botany for Degree students-Pteridophyta-P.C.Vashishta.
03. Gymnosperms-Vashishta (1976).
04. Morphology of Gymnosperms-Sporne. K.R. (1967).
05. Morphology of Gymnosperms-Coulter and Chamberlain (1978).
06. Gymnosperm-Chamberlain (1966).
07. Indian Gymnosperms in Time and Space-Ramanujan C.G.-Today & Tomorrow Publication.
08. Comparative Morphology of Vascular plants- Foster A.S. and Gifford E.M. (1959). -Published by Vakil, Feffer and Simons ltd.
09. Plant Taxonomy-Benson L. (1962).
10. Evolution and Classification of flowering plants –Cronquist A. (1968).
11. Principles of Angiosperms Taxonomy-Davis P.H. and V.M.Heywood (1963).
12. Morphology of Angiosperms-Eames A.J.(1961).
13. Taxonomy of Angiosperms-V.N.Naik (1984).
14. Biodiversity of Plants (floristic aspects) Rao R.R. (1980).
15. Cryptogrammic Botany-Smith G.M. (1973) Vol. –II
16. Morphology and Evolution of Vascular Plants –Fifford E.M.and Foster A.S. (1989)
17. Morphology of Vascular plants-Bierhorst D.W. (1971).
18. Phylogeny and classification of ferns –Jermy A.O. (1973).
19. Introduction to Pteridophytes-Rashid A. (1978).
20. Morphology of Pteridophytes –Sporne K.R. (1966).
21. The Ferns -Bower F.O. (1963).
22. Evolution and Classification of flowering plants –Cronquist A. (1968).
23. Principles of Angiosperms Taxonomy-Davis P.H. and V.M.Heywood (1963).

Paper-IV

(Cell Biology and Plant Biotechnology) 50 Marks

1. The cell (03)

1.1 Structure of Prokaryotic and Eukaryotic cell.

1.2 Comparison between Prokaryotic and Eukaryotic cell

2. Cell division (03)

2.1 Mitosis – Various stages in progression, Cytokinesis and significance 03

3.0 Nucleus (03)

3.1Ultra structure and functions 01

3.2.Structure of chromosomes, Nucleosome- Solenoid model 02

4. Endoplasmic Reticulum (03)

4.1 Occurrence

4.2 Types

4.3 Chemical composition

4.4 Functions

5. Ribosome (02)

5.1 Occurrence

5.2 Types

5.3 Chemical composition

5.4 Functions

6. Golgi complex (02)

6.1 Origin

6.2 Occurrence

6.3 Organization

6.4 Chemical composition

6.5 Functions

7. Micro bodies (02)

7.1 Peroxisomes

7.2 Glyoxysomes

8. Cell-wall (02)

8.1 Origin

8.2 Ultra structure of cell wall

8.3 Chemical composition of cell wall

8.4 Functions

9. Cell membrane (04)

9.1 Origin

9.2 Ultra structure, Models of cell membrane

I) – Bilayer – Model – Danielle – Davson's Sandwich model

II) – Subunit model – Singer – Nicholson's Fluid – Mosaic Model.

9.3 Chemical composition

9.4 Functions

10. Biotechnology (02)

10.1 Introduction and Definition

10.2 Scope of biotechnology

10.3 Multidisciplinary nature of biotechnology

11. Biotechnology in Agriculture (09)

11.1 Tissue culture – General technique, Applications of tissue culture in Agriculture and Forestry 06

11.2 Biofertilizers – Definition, Necessity, Types – BGA and Rhizobium 03

Reference Books

01. Plant cell Biology –Structure and function-Gunning B.E.S and Steer M.W.(1996).
02. Plant cell Biology-A practical approach.-Hari N.and Oparka K.J.(1994). (IRL-Press of oxford University UK.).
03. Cell Biology- De.Robert et.al. (1982), (publ.Sundar and Company).
04. Cell Biology –C.B.Powar (1992), Himalaya publ.House, Delhi.
05. Molecular Cell Biology-Albert's B.Bray D.Lewis J.Faff M.Robert K. & Watson J.D. (1999). (Publ.Garlands publishing co, New York U.S.A.
06. Text Book of cell and molecular biology –Gupta P.K. (1999), Publ.Rastogi publication, Meerat.
07. Molecular and Cellular Biology-Wolfe S.L. (1993), Wadsworth publishing Company, California, U.S.A.

08. PlantPropagation-M.K.Sadhi,WileyEasternLimited,4835/29,Ansari
Road, Daryaganj, New Delhi -110002.
09. Biotechnology and other Alternative Technologies –Amelendu Chakrawaorty,
(Indian Institute of Technology, Kharagpur),-Oxford & IBH.
Publishing Co.Pvt.Ltd.Culkatta/New Delhi.
10. Advanced Biotechnology –Kagumarti B.Rao.-K.R.S-Sambasiva Rao.-
Discovery publishing house, New Delhi -110002.
11. Biotechnology (Recent Development)-Dr.Vandan Mohod, 1999 Book Enclave, Jaipur.
12. Biotechnology in Agriculture –S.Natesh, V.L.Chopra,-S.Ramchandran,
-Oxford&IBH publishing Co.Pvt.Ltd. New Delhi,Bombay,Culcutta.
13. Biotechnology- Steve Prentiss –obis publishing Limited, London.
14. Basic Biotechnology – Rev. Fr. Dr. S. Ignacimuthu.
15. A Text Book of biotechnology –H.D. Kumar.
16 An Introduction to Biotechnology –S.C.Jain, C-A. Shivraman, T.S. Rao.
17. Advances in biotechnology-S. N. Jogdand.
Delhi 1100032.
18. A concept of a Cell biology –P.S.Verma, V.K. Agarwal,-S.Chand and
Company Limited, Ram agar New Delhi.

SOLAPUR UNIVERSITY, SOLAPUR

Practicals of B.Sc. Part – I Botany (Semester System)

(With effect from June 2013)

Botanical Excursion:

One teacher along with a batch not more than 20 students be taken for Botanical. Excursion to places of Botanical interest, one in each term. If there are female students in a batch of twenty students, one additional lady teacher is permissible for excursion. T.A. and D.A. for teacher and non-teaching staff participating in excursions should be paid as per University rules. Tour report duly certified by teacher concerned and Head of the Department should be submitted at the time of practical examination.

Practical Course:

B.Sc. Part – I Botany practical course is to be covered in twenty six practicals. These practicals are to be performed by the students. Each practical is to be supplemented by permanent slides, preserved / fresh specimens, materials, charts, herbarium sheets where ever necessary.

List of Practicals:

1. Study of Compound and Dissecting microscope.
2. Study of Spirogyra
3. Study of Sargassusm
4. Study of Mucor
5. Study of Puccinia
6. Study of Lichens
7. Study of Riccia
8. Study of Plant Disease – as per theory syllabus
9. Study of Plant Disease – as per theory syllabus
10. Study of Selaginella (sectioning of Root, Rhizophore, Leaf not expected)
11. & 12 Study of Cycas –Systematic position, Morphology of Sporophyte, anatomy of leaflet, coralloid root (permanent slide), Male cone, microsporophyll, pollen grains, Megasporophyll, V. S. of ovule (permanent slide)
13. Study of Plant families – as per theory syllabus
14. Study of Plant families – as per theory syllabus
15. Study of cell structure in Onion peels (cataphyll), it's staining and mounting.
16. Comparative cell structure of Onion and Hydrilla
17. Measurement of pH of different plant / Fruit juices in Lemon and Sugarcane.
18. Study of enzyme activity - Catalase and Dehydrogenase
19. Study of means of Vegetative Propagation-Sucker, Offset, Stolon, Runner.
20. Study of means of Vegatative propagation-Tuber, Bulb, Rhizome, Bulbil.

21. Study of Cut flowers – Gladiolus, Gerbera, Rose.
22. Propagation of Horticultural plants by Cutting ,Air – Layering and Whip grafting.
23. Techinique of potting and repotting.
24. Propagation of Horticultural plants by Budding methods – 'T'shaped and Patch budding
25. Study of Mitosis.
26. Use of dialysis to separate smaller molecules from larger molecules.
27. Study of Biofertilizers – BGA, Rhizobium (demonstration of seed dressing)

Details of Practical Examination:

A) Every candidate must produce a certificate from Head of Department of his / her college, saying that he / she has completed practical course in satisfactory manner as per terms laid down by Academic council on the recommendations of Board of Studies in Botany. The student should record his / her observation and report of each experiment in the journal.

The journal is to be signed periodically by teacher in-charge and certified by the Head of Department at the end of year. Candidates have to produce their certified journal and tour report at the time of practical examination. Candidate is not allowed to appear for the practical examination without a certified journal / a certificate from Head of Botany Department regarding the same.

B) Practical Examination should be of five hours duration and shall test a candidate in the following respect.

1. Practical study of external and internal structures of different plant types and their classification.
2. Making temporary stained preparations and identification.
3. Identification and setting of biochemical experiments.
4. Study of plant families as per syllabus.
5. Showing the Techniques Budding/grafting/layering.
6. Spotting of the specimens as per syllabus.

Distribution of marks:

Sr.No.	Name of the topic/s	Marks.
1	Algae,Fungi,Bacteria,Lichens	05
2	Bryophyte and Pteridophyte	03
3	Gymnosperms	04
4	Angiosperms	06
5	Pathology	02
6	Biochemistry and cell biology	10
7	Horticulture	08
8	Biotechnology	02
9	Tour report	05
10	Journal.	05

Nature of Question Paper (Practical)

SOLAPUR UNIVERSITY, SOLAPUR.

B.Sc. Part-I: Practical Examination in Botany.

March/April 2013.

Batch:- **Centre:-**

Date:- **Total Marks:-50**

N.B:-i) Draw neat labeled diagrams wherever necessary.

ii) Do not write about points of theoretical informations Unless asked specifically.

iii)Perform the experiments as per the instructions given by the Examiners.

Q:-1 Identnify and show the important structures observed in the specimens-A, B and C (Leave your preparation for inspection. No written answer). – 10

Q:-2 Assign the specimen 'D' to its respective family on the basis of characters observed by you in it. Give important vegetative and floral characters. Draw the floral diagram /write the floral formula of it. -06

Q:-3 Setup the biochemical experiment 'E' assigned to you and show it to the examiner. (No written answer.) - 06

Q:-4 Demonstrate the technique of air layering/budding/grafting in a specimen 'F'—04

OR

Q:-4 Demonstrate the technique of potting/repotting in experiment 'F' -04

Q:-5 Identifications:-

G) Identify and describe the slide/specimen. -02

H) Identify the disease with causal organism, give symptoms/control measures. -02

I) Identify and comment upon the slide. -02

J) Identify and comment upon the slide. -02

K) Identify and comment upon the specimen/experiment. -02

L) Identify and comment upon the specimen. -02

Q:-6 a) Journal. -05

b) Tour report. -05

Solapur University, Solapur

Nature of Question Paper For Semester Pattern

- **Faculty of Science**

(w.e.f. June 2013)

Time: - 2 hrs. **Total Marks-50**

Q. No.1) **Multiple choice questions.** **(10)**

1) ----------

a) b) c) d)

2)
3)
4)
5)
6)
7)
8)
9)
10)

Q.No.2) **Answer any Five of the following** **(10)**

i)
ii)
iii)
iv)
v)
vi)

Q.No.3) **A) Answer any Two of the following** **(06)**

i)
ii)
iii)

B) Write the Answer/Solve/Problem/Note **(04)**

Q.No.4) **Answer any Two of the following** **(10)**

i)
ii)
iii)

Q.No.5) **Answer any one of the following** **(10)**

i)
ii)