

**A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE**

VUYYURU-521165, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with "A" Grade

2019-2020



DEPARTMENT OF BOTANY

MINUTES OF BOARD OF STUDIES

EVEN SEMESTER

15-10-2019

Minutes of the meeting of Board of studies in Botany for the Autonomous courses of AG & SG Siddhartha Degree College of Arts & Science, Vuyyuru, held at 10:30 A.M on 15-10-2019 in the Department of Botany.

Members Present:-

- 1) CH. Beulah Ranjani...Chairman
(Smt. CH. Beulah Ranjani) Head, Department of Botany
AG & SG S Degree College of Arts & Science
Vuyyuru-521165.
- 2) L. Suseela.....University
(Smt. Dr. L. Suseela) Nominee Department of Biotechnology &
Head (I/c) Botany,
Krishna University, Machilipatnam.
- 3) A. Srinivas Rao.....Academic
(Sri. Dr. A. Srinivas Rao) Council Nominee Lecture in Botany,
Govt. Degree College Mandapeta,
East Godavari.
- 4) N. Manimala.....Academic
(Smt. N. Manimala) Council Nominee Head, Department of Botany
Govt. Degree College Chinthalapudi,
West Godavari.
- 5) S. Krishna Suman.....Industrialist.
(Sri. S. Krishna Suman) Natural farming.
yakamuru
Vuyyuru, Krishna d.t
- 6) N. Ramana Rao.....Member
(Sri. N. Ramana Rao) Ad hoc Lecturer in Botany
AG & SGS Degree College of Arts &
Science (Autonomous), Vuyyuru-521165.
- 7) E. Ganesh.....Member
(Sri. E. Ganesh) Ad hoc Lecturer in Botany
AG & SGS Degree College of Arts &
Science (Autonomous), Vuyyuru-521165.
- 8) K. Anusha.....student representative
(Miss K. Anusha MSc) Lecturer in chaitanya college,
Vuyyuru.

Agenda for B.O.S Meeting:

1. To recommend the syllabi (Theory & Practical), Model question paper & Guide lines for IISemesters of I B.Sc (BZC),ABC in the academic year 2019-20.
2. To recommend the syllabi (Theory & Practical), Model question paper& Guide lines for Semesters IVof II B.Sc (BZC),ABC in the academic year 2019-20.
3. To recommend the syllabi (Theory & Practical), Practical syllabus, Model question paper for General elective –A and Cluster elective C to the VI Semester of III B. Sc (BZC) for the academic year 2019-20.
4. To recommend the Guide lines to be followed by the question papers setters in Botany for II,,IV,VI Semester –End exams.
5. To continue a certificate course - Mushroom culture for II Year students in this academic year of 2019-20.
6. To recommend the teaching and evaluation methods to be followed under Autonomous statues.
- 7.Any other matter.

RESOLUTIONS

1. It is resolved to continue the same syllabi (Theory & Practical), model question paper & guide lines to be followed by the question paper setters of Botany of II of I B.Sc(B.Z.C) under Choice Based Credit System (CBCS) approved by the Academic Council of 2019-20.
2. It is resolved to continue the same syllabi (Theory & Practical), model question paper & guide lines to be followed by the question papers under Choice Based Credit System (CBCS) setters of Botany of IV semesters of II B.Sc. (B.Z.C) approved by the Academic Council of 2019-20.
3. It is resolved to follow Elective-AC (Plant tissue culture and its Biotechnological applications) and Cluster –A (plant Diversity and human welfare, Ethno Botany and Medicinal Botany, Pharmacognosy and phyto chemistry.) in VI Semester from the Academic year 2019-20.
In Ethno Botany and Medicinal Botany topic Medico ethanobotanical sources of India is added.
4. It is resolved to Continue the same Blue prints of II, IV, & VI Semesters of B. Sc Botany for the Academic year 2019-20.
5. It is resolved to implement certificate course for II Year students in the Academic year 2019-20.
6. It is resolved to continue the following teaching and evolution methods for the Academic year 2019-20.
7. Any other matter.

Teaching methods:

- Besides the conventional methods of teaching, we use modern technology i.e. Using of OHP and LCD projector to display on U boards etc; for better understanding of concepts.

Evaluation of a student is done by the following procedure:

- There are two components in the Valuation and Assessment of a student – Internal Assessment (IA) and Semester Examinations (SE). (For the Batch of Students Admitted from 2019-20 – UG).

Internal Assessment (IA):

- The maximum mark for IA is 30 and SEM is 70 for theory; and for practical papers 50.
- Each IA written examination is of 1 hour's duration for 20 marks. The tests will be conducted centrally. The average of two such IA is calculated for 20 marks.
- Other Innovative Components will be for 5 Marks. The innovative component is for 5 marks, conducted during the class hours by the staff member/ in charge of the subject, in the form of assignments/ quiz/ seminars /ppt /Open Book/Viva Voce/ Group work/ Mini Project/ Exhibition, etc. The topic and time for submission/ presentation will be announced by the staff member/ in charge of the subject in advance. Each student should explain and defend his/her presentation. For attendance 5 Marks are allotted.
- The semester examination will be of 3 hours with maximum 70 marks.
- There is no passing minimum for IA.

Semester Examinations (SE):

- A student should register himself/herself to appear for the Semester Examinations by payment of the prescribed fee.
- The Semester Examinations will be in the form of a comprehensive examination covering the entire syllabus in each subject. It will be of 3 hours duration & Foundation course 2 hours irrespective of the number of credits allotted to it.
- If a candidate fails to obtain pass marks even after the due to less mark in the IA examination, the marks of the next examination will be converted to be out of 100.
- Even though the candidate is absent for two IA exams/obtain zero marks the external marks are considered (if he/she gets 40/70) and the result shall be declared as 'PASS'
- The maximum marks for each Paper shall be 100.

Evaluation of a student is done by the following procedure:

I. Internal Assessment Examinations:

- Out of maximum 100 marks in each paper, 30 marks shall be allocated for internal assessment.
- Out of these 30 marks, 15 marks are allocated for announced tests. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks are allocated on the basis of candidate's percentage of attendance, 5 marks for seminars & remaining 5 marks for assignments to the Semesters For the III, IV, V & VI semesters it is resolved to continue the same as approved by Academic Council in 2019-20.

II. Semester-End Examinations:

- The maximum marks for I & II B.Sc (BZC) Semester-End examinations shall be 70 marks and duration of the examination shall be 3 Hours.
- The maximum marks for III B.Sc (BZC) Semester-End examinations shall be 75 marks and duration of the examination shall be 3 Hours.
- Semester-End examinations shall be conducted in theory papers at the end of every semester while in practical papers, these examinations are conducted at end of I, II, III, IV, V & VI semesters.
- Discussed and recommended for organizing Seminars, Guest lectures, Work-shops to upgrade the Knowledge of students, for the approval of the Academic Council.

CH. Beulah Rajani
Chairman

A.G & S.G. Siddhartha Degree College of Arts & Science

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BOTANY	BOT - 201C	w.e.f.2019-20	B. Sc. (BZC)
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I B. Sc - BOTANY SYLLABUS

PAPER CODE : BOT – 201C

SEMESTER- II

Paper II: Diversity of Archegoniate & Plant Anatomy

Total hours of teaching 60 hrs @ 4 hrs per week

Credits: 3

UNIT – I: BRYOPHYTA

(14 hrs)

- 1. Bryophyta:** General characters and classification (up to classes only).
2. Structure, reproduction and Life history of Marchantia and Polytrichum.
3. Evolution of Sporophyte in Bryophytes.

UNIT - II: PTERIDOPHYTA

(14 hrs)

- 1. Pteridophyta:** General characters and Classification (up to classes only).
2. Structure, reproduction and life history of Lycopodium and Marsilea.
3. Heterospory and seed habit
4. Stelar Evolution in Pteridophytes

UNIT – III: GYMNOSPERMS

(12 hrs)

- 1. Gymnosperms:** General characters and classification (up to classes only).
2. Morphology, Anatomy, reproduction and life history of Pinus and Gnetum.

UNIT – IV: Tissues and Tissue systems

(10 hrs)

1. Tissues: Meristematic and permanent tissues (Simple and Complex).
2. Shoot apical meristems and its histological organization.
3. Root apical meristems and its histological organization.

UNIT –V: Secondary growth.

(10 hrs)

1. Anomalous secondary growth in Dracaena, Boerhaavia and Bignonia.
2. Wood structure- general account, Study of local timbers Teak, Rosewood, Red sanders and Terminalia tomentosa.

I B. Sc - BOTANY Model Question Paper

Paper Code: BOT - 201

PAPER-II

SEMESTER- II

Paper title: Diversity of Archegoniate & Plant Anatomy

Time: 3 Hours

Max. Marks: 70

SECTION-A

Answer any **four** of the following question

4x5=20Marks

(Draw diagrams wherever necessary)

1. Gemma Cup.
2. Cone of Lycopodium
3. Pinus ovuliferous scale
4. Collenchyma.
5. Tunica – Corpus theory.
6. Phloem.
7. Botanical name, family and uses of Teak.
8. Botanical name, family and the properties of wood of Red sanders.

SECTION-B

Answer any **five** of the following questions:

5x10=50Marks

9. Write an essay on Evolution of sporophyte in Bryophytes.
10. Describe Sexual reproduction in Polytrichum.
11. Write an essay on the Stelar evolution in Pteridophytes.
12. Describe the structure of the sporocarp of Marselia.
13. Describe the internal structure of the Pinus needle & Mention its xerophytic characters.
14. Describe the female gametophyte in Gnetum.
15. Describe various theories regarding the organization of Root apex.
16. Give an account of the Anomalous secondary growth in Boerhaavia.

Guide lines for paper setter: (for Paper II – BOT - 201C) w.e.f. 2019-20.

1. In **section A**: Unit I, II & III must carry **one** question from each Unit, Unit IV must carry **Three** questions and Unit V must carry **two** questions.
2. In **section B**: Set minimum **two** questions from Unit I, II & III. **One** question each from Unit IV and Unit V.
3. See the following table and Model paper for marks distribution.
4. Please provide the scheme of valuation for the paper.
5. Question paper should be both in English and Telugu media.

Unit	Section - A		Section - B		Weightage in
	Questions	Marks	Questions	Marks	Marks
Unit – I	1		2		
		05		20	25
Unit - II	1		2		
		05		20	25
Unit – III	1		2		
		05		20	25
Unit – IV	3		1		
		15		10	25
Unit – V	2		1		
		10		10	20
Max. Q & marks	8	(x 5) = 40	8	(x 10) = 80	(Total questions =16) Total marks = 120
Max. Q and marks for Valuation	Questions	Marks	Questions	Marks	Max. marks
	4		5		
		(4X 5) = 20		(5 X 10) = 50	70

INTERNAL EXAMS – 30 Marks

(20 marks for unit tests, 5marks for attendance, 5marks for Seminars).

I B.Sc SEMESTER - II
BOTANY PRACTICAL SYLLABUS

Paper - II: Diversity of Archegoniate & Plant Anatomy **Paper - 201C (P)**
Total hours of laboratory Exercises 30 hrs @ 2 per week Credits - 2

I. Morphology (vegetative and reproductive structures), anatomy of the following:-

1. **Bryophyta** : Marchantia and Polytrichum.
2. **Pteridophyta**: Lycopodium and Marsilea.
3. **Gymnosperms** : Pinus and Gnetum.

II. Anatomy:-

1. Demonstration of double staining technique.
2. Tissue organization in root and shoot apices using permanent slides.
3. Preparation of double staining slides.
4. Anomalous secondary structure (Examples as given in theory syllabus).
5. Microscopic study of wood in T.S., T.L.S. and R.L.S.
6. Field visits.

I B.Sc., SEMESTER-II: BOTANY PRACTICAL MODEL PAPER II
II P: Diversity of Archegoniate & plant Anatomy

- Q.1. Cut T.S of the **material** – **A** Identify given reasons draw labeled diagrams.
Leave the preparation for evaluation. **4 marks**
2. Cut T.S of the **material** – **B** Identify given reasons draw labeled diagrams.
Leave the preparation for evaluation. **5 Marks**
3. Cut T.S of the **material** - **C** Identify given reasons draw labeled diagrams.
Leave the preparation for evaluation. **5 Marks**
4. Write a critical notes and Identify - **D, E, and F** **(3x3) = 9 Marks**
5. Viva- Voce (Any **2** simple questions from syllabus) - **2 Marks**
- Internal Assessment **25 Marks.**

Total : 50 Marks

Key:

- A. Bryophyta/ Pteridophyta material
- B. Gymnosperm material.
- C. Anatomy material.
- D. Whole specimen or permanent slide of Bryophyta/ Pteridophyta
- E. Whole specimen or permanent slide of Gymnosperm.
- F. Whole specimen or permanent slide of wood.

I B.Sc., SEMESTER-II: BOTANY PRACTICAL MODEL PAPER II

II P: Diversity of Archegoniate & plant Anatomy

A. Bryophyta / Pteridophyta - Section cutting..... (For A (Slide 2 marks, diagrams-1 marks, Identification-1 marks)	4 Marks
B. Gymnosperms - Section cutting.....	5 Marks
C. Anatomy - Section cutting..... (For B and C (Slide 3 marks, diagrams-1 marks, Identification-1 marks)	5 Marks
D. Bryophyta / Pteridophyta (From Bryophyta if “A” Material is from Pteridophyta.....Vice versa)	3 Marks
E. Gymnosperms.....	3Marks
F. Anatomy.....	3Marks
(For D, E and F = Identification -1Mark , Notes -1Mark, Diagram – 1Mark).	
G. Viva.....	2 marks

Total: **25 Marks**

Internal Assessment

a) Record	10Marks
b) Submission of Chart / Model	5 Marks
c) Attendance	5 Marks
d) Internal Practical Exam	5 Marks

Total : **25 Marks**

Total: 50 Marks

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BOTANY	BOT-401C	w.e.f. 2019-20	B. Sc. (BZC)
SEMESTER - IV	II B. Sc - BOTANY SYLLABUS		PAPER – IV

Plant Embryology and Plant Metabolism

Hours: 60 @ 4 hrs per week

UNIT – I: EMBRYOLOGY

(12hrs)

1. Introduction: History and Importance of Embryology.
2. Anther structure, Microsporogenesis and development of male gametophyte.
3. Ovule structure and types; Megasporogenesis; Monosporic; Bisporic and Tetrasporic types of female gametophyte / embryosac development.
4. Pollination -Types, Fertilization.

UNIT –II: EMBRYOLOGY AND PALYNOLOGY

(12 hrs)

1. Endosperm Development and types.
2. Embryo - development and types.
3. Polyembryony and Apomixis - an outline.
4. Palynology: Principles and applications.

UNIT –III: PLANT METABOLISM- I

(12 hrs)

1. Photosynthesis: Electromagnetic spectrum, absorption and action spectra; Red drop and Emerson enhancement effect, concept of Z scheme in photosystems, Photosynthetic pigments, mechanism of photosynthetic electron transport and evolution of oxygen, photo phosphorylation, carbon assimilation pathways: C₃, C₄ & CAM and Photorespiration.
2. Translocation of organic substances: Mechanism of phloem transport, source-sink relationships.

UNIT –IV: PLANT METABOLISM- II

(12 hrs)

1. Respiration: Aerobic and Anaerobic, Glycolysis, Krebs cycle, electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway.
2. Lipid Metabolism: Structure and functions of lipids, conversion of lipids to carbohydrates, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT

(12 hrs)

1. Growth and development: Definition, phases and kinetics of growth, Physiological effects of phytohormones - auxins, gibberellins, cytokinins, ABA and ethylene
2. Physiology of flowering and photoperiodism, role of phytochrome in flowering.
3. Stress Physiology: Concept and plant responses to water, salt and temperature stresses.

BOTANY	BOT- 401	w.e.f. 2019-20	B. Sc. (BZC)
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II B. Sc – BOTANY Model Question Paper

Paper Code: BOT - 401

SEMESTER- IV

PAPER-IV: Plant Embryology and Plant Metabolism

Time: 3 Hours

Max. Marks: 70

SECTION-A

Answer any **four** of the following questions
(Draw diagrams wherever necessary)

4x5=20Marks

1. Microsporogenesis.
2. Allogamy.
3. Helobial endosperm.
4. Emerson enhancement effect.
5. Anaerobic respiration.
6. Ethylene.
7. Photoperiodism.
8. Phytochrome.

SECTION-B

Answer any **five** of the following questions.
(Draw diagrams wherever necessary)

5x10=50Marks

9. What is an Embryosac? Describe any five of the tetrasporic type of Embryosac developments.
10. Give an account of Polyembryony.
11. Write an essay on the Principles and applications of Palynology.
12. Describe the carbon assimilation pathway in C₄ plants.
13. Write an essay on the Translocation of organic substances in higher plants.
14. Describe various reactions of Krebs cycle.
15. Write an essay on various types of Lipids.
16. Give an account of Auxins and Gibberellins.

Guide lines for paper setter: (for Paper IV – BOT- 401) w.e.f. 2019-20

1. In **section A**: Unit II, III & IV must carry **one** question from each Unit, Unit I must carry **two** questions and Unit V must carry **three** questions.
2. In **section- B**: Set minimum **two** questions from Unit II, III & IV.

One question each from Unit I and Unit V.
3. See the following table and Model paper for marks distribution.
4. Please provide the scheme of valuation for the paper.
5. Question paper should be both in English and Telugu media.

Unit	Section - A		Section - B		Weightage in
	Questions	Marks	Questions	Marks	Marks
Unit – I	2		1		
		10		10	20
Unit - II	1		2		
		05		20	25
Unit – III	1		2		
		05		20	25
Unit – IV	1		2		
		05		20	25
Unit – V	3		1		
		15		10	25
Max. Q & marks	8	(x 5) = 40	8	(x 10) = 80	(Total questions =16) marks = 120
Max. Q and marks for Valuation	Questions	Marks	Questions	Marks	Max. marks
	4		5		
		(4 X 5) = 20		(5 X 10) = 50	70

[INTERNAL EXAMS - 30Marks

(20marks for unit tests, 5 marks for seminar and remaining 5 marks for attendance).

II B. Sc – BOTANY SEMESTER- IV.

PRACTICAL SYLLABUS

PAPER- IV - Plant Embryology and Plant Metabolism

(BOT – 401)

Total hours of laboratory Exercises 45 hrs @ 3 per week . w.e.f. 2019-20

Suggested Laboratory Exercises:

1. Structure of pollen grains using whole mounts (Catharanthus, Hibiscus, Acacia, Grass).
2. Demonstration of Pollen viability test using in- vitro germination (Catharanthus).
3. Study of ovule types and developmental stages of embryo sac using permanent slides / Photographs.
4. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs.
5. Isolation and mounting of embryo (using Symopsis / Senna / Crotalaria).

Major experiments:

6. Separation of chloroplast pigments using paper chromatography technique.
7. Rate of photosynthesis under varying CO₂ concentration.
8. Effect of kind of light intensity on oxygen evolution during photosynthesis using Wilmontt' bubbler.
9. Titratable acidity estimation of Lemon or Tamarind leaves.

Minor experiments:

10. Release of CO₂ in Aerobic respiration.
11. Demonstration of the process of fermentation using Kuhne's fermentation vessel.
12. Demonstration of Phototropism.
13. Measuring the Plant growth using Arc Auxanometer.

1. Conduct experiment 'A', write down the procedure and conclusions.

Tabulate the results if any.....11M

2. Write the salient features of experiment 'B' with the help of neat labelled diagram. 05M

3. Identify and write notes on 'C, D & E' (3X3M) 09M

Total 25M

Scheme of valuation

1. 'A' –Physiology –major experiment

Setting and conducting of the experiment 6M, Procedure 3M, Conclusion1M, tabulation1M.

= 11M

2. 'B'- Physiology –minor experiment Salient features 3M, Diagram2M

= 05M

3. Identify C, D and E (3X3)

(Identification - 1 + Diagram-1 + Notes- 1 =Total = 3marks for each)

= 09

'C' from Anther T.S / Pollen grains.

'D' - Slide from types of Ovules.

'E'– Slide from Embryosacs / Embryos.

(Total.....25M)

Internal:

a) Record10M

b) Internal Practical Exam/ Self study project report. 08M

c) Attendance 05M

d) Assignment 02M

Grand Total 50M

BOTANY	BOT-601 (GE)	2019-2020	B.Sc. (BZC)
PAPER – VII	ELECTIVE-C	SEMESTER- VI	
Plant tissue culture and its Biotechnological applications			
Total hours of teaching 45hrs @ 3hrs per week			Credits: 3

Unit I: PLANT TISSUE CULTURE – 1

(12hrs)

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristems culture, organ culture, Totipotency of cells.
2. Sterilization procedures, culture media composition and preparations of explants. Murashige and Skoog's (MS medium), Cell and protoplast culture.
3. Somatic Hybrids and Cybrids (out lines), Artificial Seeds, Somaclonal variations. Applications of Tissue culture (Brief account).

UNIT-II: Plant Tissue culture -2

(12hrs)

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Cryopreservation; Germ plasm conservation.

Unit III: Recombinant DNA technology

(12hrs)

1. r-DNA technology: Steps in r-DNA technology and tools.
2. Cloning Vectors: Prokaryotic (pBR322, Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC).
3. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR Mediated gene cloning)

Unit IV: Methods of gene transfer

(12hrs)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer By Electroporation, Microinjection, Micro projectile bombardment.
2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

Unit V: Applications of Biotechnology

(12 hrs)

1. Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance.
2. Genetic modification – transgenic plants for pest resistant (Bt-cotton); herbicide resistance (Round Up Ready soybean); improved agronomic traits flavrSavr tomato, Golden rice.

Plant tissue culture and its Biotechnological applications

SEMESTER- VI

ELECTIVE-C

PAPER – VII

Time: 3 Hours

Paper code: BOT-VII C

Max. Marks: 75

SECTION-A

Answer any five of the following question

5x5=25M.

(Draw diagrams wherever necessary)

1. Organ culture.
2. Somatic hybrids.
3. Cryopreservation.
4. Application of tissue culture.
5. Restriction Endonuclease.
6. Bacterial transformation.
7. GUS.
8. Bt-Cotton.

SECTION-B

Answer any Five of the following questions.

5x10=50M.

(Draw diagrams wherever necessary)

9. Describe the composition and preparation of different culture media.
10. Explain the callus sub-culture and their growth and measurement.
11. Give an account on secondary metabolites.
12. Write notes on endosperm culture and their applications.
13. Explain the PCR mediated gene cloning.
14. Explain the various types of cloning vectors.
15. Write about methods of gene transfer techniques.
16. Write an essay on application of Biotechnology in the field of medicine and industry.

Guide lines for paper setter: (for Paper VII -BOT-601) W.e.f. 2019-20.

1. In Section A: Unit I,III,IV must carry Two question from each unit. Unit II, V must carry one question.
2. In section-B: Set minimum two questions from Unit I, II, III and Set One Question from IV, V.
3. See the following table and Model paper.
4. Please provide the scheme of valuation for the paper.
5. Question paper should be both in English and Telugu media.

Unit	Section – A		Section - B		Weightage in
	Questions	Marks	Questions	Marks	Marks
Unit – I	2		2		
	10		20		30
Unit – II	1		2		
	5		20		25
Unit – III	2		2		
	10		20		30
Unit-IV	2		1		
	10		10		20
Unit-V	1		1		
	5		10		15
Max. Q & marks	8 (x 5) = 40		8 (x 10) = 80		(Total questions = 16) Marks 120
Max. Q and marks for Valuation	Questions	Marks	Questions	Marks	Max. marks
	5		5		
	(5 x 5) = 25		(5 x 10) = 50		75

INTERNAL EXAMS - 25Marks

(15 mark for unit tests, 5 marks for assignments and remaining 5 marks for seminar etc.)

1. (a) Preparation of MS medium.

(b) Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.
2. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
3. Construction of restriction map of circular and linear DNA from the data provided.
4. Study of methods of gene transfer through photographs: Agrobacterium- mediated, direct gene transfer by electroporation, microinjection, and micro projectile bombardment.
5. Different steps involved in genetic engineering for production of Bt. cotton, Golden rice, Flavr Savr tomato through photographs.
6. Isolation of plasmid DNA.
7. Restriction digestion and gel electrophoresis of plasmid DNA (optional)
8. Field visit to a lab involved in tissue culture
9. Study project under supervision of lecturer – tissue culture/ genetic engineering

Expected domain skills to be achieved: Ability to prepare artificial nutrient media, preparing independently, applying various sterilization procedures for media, glassware and biological materials, in vitro propagation of Banana callus, morphogenesis, clonal propagation methods, isolation of plasmid DNA individually and as a group.

Total hours of teaching 30hrs @ 2hrs per week**Credits: 2**

Q1. Project report (A) -.....	10M
Viva-voce on study project.....	02M
Q2. Identify and write notes on B, C and D (3x3).....	09 M
B- Tool/instrument/container used in sterilization	
C- Tool/instrument/container used in gene transfer	
D- GM crops (Photographs)	
Q3. Construct restriction map of circular and/ or linear DNA from the data Provided.....	06M
Q 4. Field report.....	03M

Total.....30 **Marks****Internal Assessment**

a. Record -	05M
b. Attendance.....	05M
e. Internal practical exam.....	10M

Total... 20Marks

Total ----- 50M

III-BZC B. Sc	BOTANY-VIII	BOT-602 (CE)	2019-20
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Paper – VIII-A-1: PLANT DIVERSITY AND HUMAN WELFARE

Credits: 3

Total hours of teaching 60hrs @ 6hrs per week

Unit- I: Plant diversity and its scope:

(12hrs)

1. Genetic diversity, Species diversity, Plant diversity at the ecosystem level,
2. Agro biodiversity and Vavilov Crop centers.
3. Values and uses of biodiversity: Ethical and aesthetic values, Uses of plants.

Unit -II: Loss of biodiversity:

(12hrs)

1. Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity, projected scenario for biodiversity loss.
2. Management of plant biodiversity: Organizations associated with biodiversity Management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and Communication.

Unit-III: Contemporary practices in resource management:

(12hrs)

1. Environmental Impact Assessment (EIA), Geographical Information System GIS,
2. Solid and liquid waste management.

Unit -IV: Conservation of biodiversity

(12hrs)

1. Conservation of genetic diversity, species diversity.
2. Social approaches to conservation, Biodiversity awareness Programmes, Sustainable development.

Unit- V: Role of plants in relation to Human Welfare

(12hrs)

- 1 Importance of forestry, their utilization and commercial aspects-
a) Avenue trees, b) ornamental plants of India.
- 2 Fruits and nuts: Important fruit crops their commercial importance.
Wood, fiber and their uses.

III B. Sc – BOTANY Model paper (2019-2020)

SEMESTER- VI

Paper – VIII-A-1

PAPER – VIII

PLANT DIVERSITY AND HUMAN WELFARE

Time: 3 Hours

Max. Marks: 75

SECTION-A

Answer any five of the following question

5x5=25M.

1. Species Diversity.
2. Wild Taxa.
3. NBPGR.
4. Biodiversity and its Conservation.
5. EIA.
6. Geographical information system (GIS).
7. Sustainable Development.
8. Fiber and their uses.

SECTION-B

Answer any Five of the following questions.

5x10=50M.

9. Give a Note on Plant Diversity and its Scope.
10. Write about Values and Uses of Biodiversity.
11. What is Biodiversity? Discuss about the Loss of Biodiversity?
12. Explain the Various Types Organizations in Biodiversity?
13. Write an essay on EIA ?
14. Write essay an Solid and Liquid Waste Management?
15. What is Conservation? Explain the In-situ and Ex-situ conservation?
16. What are Fruit crops? Explain their Commercial importance?

Guide lines for paper setter: (for Paper VIII -BOT-602) W.e.f. 2019-20

1. In Section A: Unit I, II, III, must carry Two question from each unit. Unit IV, V must carry one question.

2. In section-B: Set minimum two questions from Unit I, II & III and Set One Question from IV, V.
3. See the following table and Model paper.
4. Please provide the scheme of valuation for the paper.
5. Question paper should be both in English and Telugu media.

Unit	Section - A		Section - B		Weightage in
	Questions	Marks	Questions	Marks	Marks
Unit – I	2		2		
	10		20		30
Unit – II	2		2		
	10		20		30
Unit – III	1		2		
	05		20		25
Unit-IV	1		1		
	5		10		15
Unit-V	2		1		
	10		10		20
Max. Q & marks	8 (x 5) = 40		8 (x 10) = 80		(Total questions = 16) Marks 120
Max. Q and marks for Valuation	Questions	Marks	Questions	Marks	Max. marks
	5		5		
	(5 x 5) = 25		(5 x 10) = 50		75

INTERNAL EXAMS - 25Marks

(15 mark for unit tests, 5 marks for assignments and remaining 5 marks for seminar etc)

Paper – VIII-A-1: Practicals:

PLANT DIVERSITY AND HUMAN WELFARE

SEMESTER- VI

BOT-602-A-1(CL) P

Max. Marks: 50

Time: 3hrs

- 1) Study of plant diversity (flowering plants).
- 2) Study of exotic species- Identification and morphological characteristics.
- 3) Identification of forest trees through bark, wood, flowers, leaves and fruits.
- 4) Maceration, Study of wood (Tracheary elements, fibres).
- 5) Methods of preservation and canning of fruits.
- 6) Visit to the local ecosystem to study the plants.
- 7) Study of Solid and Liquid waste management systems in rural/urban areas.

SCHEME OF PRACTICAL EXAMINATION

- I. Assign the plants **A, B and C** to their respective families, giving reasons, family name and classification-1marks, important diagrams- 2 marks.....**09 marks**
- II. Give the protocol of **D****04marks**
- III. Comment on specimens **E, F and G****3x3 = 09 marks**
- IV. Report on Field visit..... **4 marks**
To study sources of firewood (10 plants), timber-yielding trees (10trees) and bamboos.
- V. Viva-Voce**04marks**
- Total..... **30 Marks**

Internals

- a. Record -05M
- b. Attendance.....05M
- c. Internal practical exam.....10M
- Total..... **20 Marks**

Total -----50M

KEY

A-Cultivated Plant

B- Wild Plant

C –Exotic plant

D- Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas

E. Bark/wood/fruit yielding plant

F. Nuts/ Alcoholic beverage plant

G. wood /Fibre yielding plant

Paper – VIII-A-1: Practical's:

PLANT DIVERSITY AND HUMAN WELFARE

SEMESTER- VI

BOT-602-A-(CL) P

SCHEME OF PRACTICAL EXAMINATION

Time: 3hrs

Max. Marks: 50

-
- I. Assign the plants **A, B and C** to their respective families, giving reasons, family name and classification-1marks, important diagrams- 2 marks.....**09 marks**
- II. Give the protocol of **D**.....**04marks**
- III. Comment on specimens **E, F and G****3x3= 09 marks**
- IV. Report on Field visit..... **4 marks**
To study sources of firewood (10 plants), timber-yielding trees (10trees) and bamboos.
- V. Viva-Voce.....**4marks**

Total ---- 30marks

Internals:

- a. Record -05M
- b. Attendance.....05M
- c. Internal practical exam.....10M

Total ---- 20marks

Total -----50M

KEY

A-Cultivated Plant

B- Wild Plant

C –Exotic plant

D- Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas

E. Bark/wood/fruit yielding plant

F. Nuts/ Alcoholic beverage plant

G. wood /Fibre yielding plant

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III. BZC (B. Sc)	BOTANY-VIII	BOT- 603 (CE)	2019-20
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Paper – VIII-A-2

Credits: 3

ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of teaching 60hrs @ 6hrs per week

Unit –I: Ethnobotany (12hrs)

1. Introduction, concept, scope and objectives
2. Major and minor ethnic groups or Tribal's of India, and their lifestyles.
3. Plants used by the tribal populations:
 - a) Food plants, b) Intoxicants
 - c) Beverages, d) Resins and oils and miscellaneous uses.

Unit -II: Role of ethnobotany in modern Medicine (12hrs)

1. Role of Ethnobotany in modern medicine with special example; Rauvolfiaserpentina, Artemisia annua, Withaniasomnifera.
2. Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
 - a)Azadirachtaindica, b)Vitexnegundo,c)Ocimum sanctum,,d) phyllanthus niruri
3. Medico-Ethnobotanical Sources of India.

Unit-III: Ethno botany as a tool to protect interests of ethnic groups (12hrs)

1. Sharing of wealth concept with few examples from India.
2. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

Unit -IV: History, Scope and Importance of Medicinal Plants, Indigenous Medicinal Sciences (12hrs)

1. Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments.
- 2 Homeopathy: Origin of Homeopathy medicinal systems, Basis of Homeopathy, plants used in Homeopathy medicine.

Unit -V: Conservation of endangered and endemic medicinal plants (12hrs)

1. Definition: endemic and endangered medicinal plants,
2. Red list criteria
3. In situ conservation: Sacred groves, National Parks
4. Ex situ conservation: Botanical Gardens, Seed Banks.

III B. Sc – BOTANY Model paper (2019-2020)

Title of the Paper: **ETHNOBOTANY AND MEDICINAL BOTANY**

SEMESTER- VI
Time: 3 Hours

PAPER – VIII

Cluster – A

Paper – VIII-A-2
Max. Marks: 75

SECTION-A

Answer any five of the following question

5x5=25M.

1. Intoxicants.
2. Withania somnifera.
3. Phyllanthus niruri
4. Curcuma langa.
5. Biopiracy
6. Saptdhatu and Tridosha.
7. Tumors treatments.
8. Red list criteria.

SECTION-B

Answer any Five of the following questions.

5x10=50M.

9. Explain the Relevance of Ethno-Botany in the present Context.
10. Discuss about Major and Minor Ethnic groups of India.
11. Write about Botanical name, Family, Active principle and medicinal uses of Rauvolfia serpentina, Artemisia annua.
12. Write about the Medico-Ethnobotanical Sources of India.
13. Write about the Intellectual property rights and Traditional knowledge.
14. Write an Essay on Basic concepts of Ayurveda.
15. What is Homeopathy system of Medicine ? Explain their Basic Concepts ?
16. Give an account of Endemic and Endangered Medicinal plants ?

Guide lines for paper setter: (for Paper VIII-BOT-603(CE)) W.e.f. 2019-20

1. In Section A: Unit I, IV, must carry two questions from each unit. Unit II must carry Two Question. Unit III, V must carry one question.

2. In section-B: Set minimum Two questions from Unit I, II & IV and Set One Question from III , V.
3. See the following table and Model paper.
4. Please provide the scheme of valuation for the paper.
5. Question paper should be both in English and Telugu media.

Unit	Section - A		Section - B		Weightage in
	Questions	Marks	Questions	Marks	Marks
Unit – I	2		2		
	10		20		30
Unit – II	2		2		
	10		20		30
Unit – III	1		1		
	05		10		15
Unit-IV	2		2		
	10		20		30
Unit-V	1		1		
	5		10		15
Max. Q & marks	8 (x 5) = 40		8 (x 10) = 80		(Total questions = 16) Marks 120
Max. Q and marks for Valuation	Questions	Marks	Questions	Marks	Max. marks
	5		5		
	(5 x 5) = 25		(5 x 10) = 50		75

INTERNAL EXAMS - 25Marks

(15 mark for unit tests, 5 marks for assignments and remaining 5 marks for seminar etc.).

**III B. Sc – Practical Paper
ETHNOBOTANY AND MEDICINAL BOTANY
BOT-VIII-603-A- 2 (CL) P**

**SEMESTER- VI
Time: 3 Hours**

Max. Marks- 50

1. Ethno botanical specimens as prescribed in theory syllabus
2. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (Minimum 8 plants) used in traditional medicine.

3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.

Practical Question Paper

- I. Identify the specimen A- Give reasons (morphological and anatomical) and draw Labeled sketches10marks
- II. Identify and write about the medicinal uses of B and C.....2x4 = 08 marks
- III. Comment on D and E.....2 x 2= 04 marks
- IV. Report on Field visit:.....04 marks
List to be prepared mentioning special features of plants used by tribal Populations as Medicinal Plants & Spices. Write their botanical and common names, Parts used and diseases/disorders for which they are prescribed.
- V. Viva-voce..... 04 marks
- Total.....**30Marks**

Internals Assessment

- a. Record -05M
- b. Attendance.....05M
- c. Internal practical exam.....10M
- Total.....**20 Marks**

Total-----50Marks

KEY

- A-Plants given in unit II (i)
- B-Plants used in Ayurvedic preparations (Amla in Chyavanprash, Senna in Laxatives)
- C - - Do -
- D. Photographs of National parks, Biosphere reserves and Botanical gardens.
- E. Photograph of famous personalities in Ayurveda/Siddha medicine.

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III-BZC B.Sc	BOTANY-VIII	BOT-604- (CE)	2019-20
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SEM-VI: **Pharmacognosy and Phytochemistry**

Credits: 3

Total hours of teaching 60hrs @ 6hrs per week

Unit-I: Pharmacognosy

(12hrs)

1. Definition, Importance
2. Classification of drugs - Chemical and Pharmacological
3. Drug evaluation methods

Unit –II: Organoleptic and microscopic studies:

(12hrs)

1. Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of
2. a) *Adhatoda vasica*(leaf) b) *Strychnos nuxvomica* (seed),
c) *Rauwolfia serpentina*(root) d) *Zinziber officinalis* e) *Catharanthus roseus*.

Unit-III: Secondary Metabolites:

(12hrs)

1. Definition of primary and secondary metabolites and their differences, Major types - terpenes, Phenolics, alkaloids, terpenoids, steroids.
2. A brief idea about extraction of alkaloids. Origin of secondary metabolites—detailed account of Mevalonate pathway, Shikimate pathway.

UNIT-IV: Phytochemistry:

(12hrs)

• Biosynthesis and sources of drugs:

1. Structural type biosynthesis importance of simple Phenolic compounds, coumarins, Flavonoids.
2. Steroids, sterols: Biosynthesis, commercial importance.
3. Alkaloids: Different groups, biosynthesis, bioactivity.
4. Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs:

(12hrs)

1. Vaccines, toxins and toxoids, immune globulins, antiserums,
2. Vitamins, Antibiotics – chemical nature, mode of action.
3. Pharmacological action of plant drugs – tumor inhibitors, PAF antagonists, antioxidants, phytoestrogens and others.

SEMESTER- VI

Paper – VIII-A-3

PAPER – VIII Cluster – A

Title of the Paper: **Pharmacognosy and Photochemistry**

Time: 3 Hours

Max. Marks:

75

SECTION-A

Answer any five of the following question

5x5=25M.

1. Classification of Drugs.
2. Catharanthus roseus.
3. Difference between Primary and Secondary Metabolites.
4. Trpenoids.
5. Flavonoids.
6. Aromatherapy
7. Vaccines.
8. Vitamins.

SECTION-B

Answer any Five of the following questions.

5x10=50M.

9. Give an account on Pharmacognosy ?
10. Write an essay on Drug Evolution methods ?
11. Write about nature and Active principles of Adhatda vasica, Rauwfa serpentine ?
12. Write about common Adulteration of Zanzibar officinalis, Strychnosnuxvomica ?
13. Give an Brief note on Extraction of Alkalods ?
14. Give an account of mevalonate pathway ?
15. Write about Bio-Synthesis and Commercial importance of Steroids, Sterols ?
16. Explain the role of Different Enzyme inhibitors ?

Guide lines for paper setter: (for Paper VI-BOT-604) W.e.f. 2019-20.

1. In Section A: Unit III, IV, V must carry two questions from each unit. Unit I, II, must carry One question.
2. In section-B: Set minimum two questions from Unit I, II & III and Set One Question from IV, V.
3. See the following table and Model paper.
4. Please provide the scheme of valuation for the paper.
5. Question paper should be both in English and Telugu media.

Unit	Section - A		Section - B		Weightage in
	Questions	Marks	Questions	Marks	Marks
Unit – I	1		2		
		5		20	25
Unit – II	1		2		
		5		20	25
Unit – III	2		2		
		10		20	30
Unit-IV	2		1		
		10		10	20
Unit-V	2		1		
		10		10	20
Max. Q & marks	8	(x 5) = 40	8	(x 10) = 80	(Total questions = 16) Marks 120
Max. Q and marks for Valuation	Questions	Marks	Questions	Marks	Max. marks
	5		5		
		(5 x 5) = 25		(5 x 10) = 50	75

INTERNAL EXAMS - 25Mark

(15 mark for unit tests, 5 marks for assignments and remaining 5 marks for seminar etc.)

Pharmacognosy and Phytochemistry

SEMESTER- VI
Time: 3 Hours

BOT-VIII-604-A- 3 (CL)P
Max. Marks- 50

-
1. Physical and chemical tests for evaluation of unorganized drugs-
Asaphoetida, Honey, Castor oil. Acacia
 2. Identification of bark drugs – cinchona, cinnamom
 3. Identification of fruit drugs – Cardamom, Coriander
 4. Identification of root and rhizome drugs- Ginger, Garlic, Turmeric
 5. Identification of whole plant – Aloes, Vinca, Punarnava
 6. Herbarium of medicinal plants (minimum of 20 platns)
 7. Collection of locally available crude drugs from local venders (minimum of 20)

Practical Question Paper

- I. Identify the given crude drugs **A& B** by Anatomical study and Morphological Study.....**2X5 = 10marks**
- II. Perform suitable chemical test and identify the given phytochemical **C**.....**.05marks**
- III. Comment on D and E**2x3= 06 marks**
- IV. Herbarium and submission of drugs -..... **.05 marks**
- IV. Viva-Voce**.04 marks**
- Total.....**30Marks**

Internals:

- a. Record -05M
- b. Attendance.....05M
- c. Internal practical exam.....10M
- Total.....**20Marks**

Total -----50M

KEY

A-Flower/fruit drugs

B-Rhizome/whole plant drugs

C- Tannins/ phenolics/steroids/ isoprenoids /Asaphoetida/ Honey/ Castor oil/ Acacia

D. Column Chromatography/ Gas Chromatogram/HPLC (photograph/ instrument used for chemical analysis of drugs.

First year II sem

Suggested Reading

1. The embryology of angiosperms - Bhojwani S.S., Bhatnagar S.P. - Vikas publishing house private Ltd, New Delhi.
2. An introduction to the embryology of angiosperms - Maheswari. P - Tata Mac graw hill company Ltd, New Delhi.
3. Plant physiology - Taiz. L. and E. Zeizer - Sinauer Associates, Inc., publishers. Massachusetts, USA.
4. Introduction to Plant physiology - Hopkins - John Wiley and sons Inc., New York, USA.
5. Plant physiology - Salisbury. F.B. and C.W. Ross - Wordsworth Learning Inc., USA.

Elective paper

Books for Reference:

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
4. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. VikasPublicationHouse Pvt. Ltd., New Delhi. 5th edition.

CLUSTER PAPER I

Suggested Readings:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.

3. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

CLUSTER PAPER II

Suggested Readings:

- 1) S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
- 2) Glimpses of Indian. Ethnobotny, Oxford and I B H, New Delhi – 1981.
- 3) S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
- 4) S.K. Jain, 1990. Contributions of Indian ethnobotny. Scientific publishers, Jodhpur.
- 5) Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons Chichester

CLUSTER PAPER III

BOOKS FOR REFERENCE:

1. Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd. 2. Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.
2. Gurdeep Chatwal, 1980. Organic chemistry of natural productis. Vol.I.Himalaya Publishing house.
3. Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural Product chemistry N.K. Mehra . Narosa Publishing House Pvt. Ltd. New Delhi.
4. Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house , Meerut.

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CERTIFICATE COURSE

SEMESTER - III

Total hours of teaching 30 hrs @ 4 hrs per week

MUSHROOM CULTIVATION

Max.Marks:30

UNIT-1

(8 hrs)

1. Mushroom Cultivation- Introduction, Uses, Types of mushrooms.
2. Preparation of Mother Spawn in Saline bottle, sterilization.
3. Cultivation of milky mushrooms.

UNIT-2

(8 hrs)

4. Soil PH, Water, Soil sterilization, dark room, light room.
5. Controlled room temperature, culture caring.
6. Diseases and their controlling methods.

UNIT-3

(8 hrs)

7. Storage and nutritional value.
8. Industrial edible mushrooms, poisonous mushrooms.
9. Importance and Medicinal value of mushrooms.

UNIT-4

(6 hrs)

10. Types of food prepared from mushrooms -
11. Marketing in India. Export value.

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CERTIFICATE COURSE

SEMESTER - III

MUSHROOM CULTIVATION

Max.Marks:30

Model paper

SECTION-A

Answer any 4 of the following question

4x3=12M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

SECTION-B

Answer any 3 of the following question

3x6=18M

- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

