

“Education for Knowledge, Science and Culture”

Dr Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS),

KOLHAPUR

DEPARTMENT OF BIOTECHNOLOGY,

2018-2019



BIOTECH

“BASICS IN PLANT TISSUE CULTURE”

(Course File)

"Education for Knowledge, Science and Culture."

-Shikshan Maharshi Dr. Bapuji Salunke.

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College' Kolhapur

Department of Biotechnology

NOTICE

All the B.Sc. (II/III) students are hereby informed that Department of Biotechnology is organizing Add on course entitled - "Basic techniques in Plant Tissue Culture". The duration of the course will be of 6 months. Interested students should register their name in the department of biotechnology on before 5 August 2018 (11.30 am to 4.30 pm). The time table of the course will be displayed on notice board soon.

Note: Fees for the course - Rs. 1200 /- per students


Course Coordinator

(Mr. A. Upadhye)
CO-ORDINATOR
ADD-ON COURSE








DEPARTMENT OF BIOTECHNOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)









(Dr. S.Y. Hongkar.)
PRINCIPAL
Vivekanand College
Kolhapur.

To be circulated in

B.Sc. IIIrd yr

- 1) Botany (Room No. 21) 
- 2) Zoology (Room No. 22)  B.Sc. IIIrd Sem
- 3) Microbiology (Room No. 23)  23/08/18
- 4) Biotechnology (Room No. 24)  Palane
- 5) O/C
- 6) Chemistry (Room No. 19)  Ganpat
- 7) Physics  Gh
- 8) Computer Science  Anbil

B.Sc. IInd yr.

- 1) Botany  21.7.18
- 2) Zoology 
- 3) Microbiology 
- 4) Biotechnology (optical)  Majankar
- 5) R.No. - 42 

"Education for Knowledge, Science and Culture."

-Shikshan Maharshi Dr. Bapuji Salunke.

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Department of Biotechnology

NOTICE

All the B.Sc. (II/III) students are hereby informed that Department of Biotechnology is organizing Add on course entitled – "Basic techniques in Plant Tissue Culture". The duration of the course will be of 6 months. Interested students should register their name in the department of biotechnology on before 5 August 2018 (11.30 am to 4.30 pm). The time table of the course will be displayed notice board soon.

Note: Fees for the course – Rs. 1200 /- per students


COORDINATOR

ADD-ON COURSE
DEPARTMENT OF BIOTECHNOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

for Notice Board




(Dr. S.Y. Hongekar.)
PRINCIPAL
Vivekanand College
Kolhapur.

To be circulated in

- Bsc-III yr
- 1) Botany (Room No. 21)
 - 2) zoology (Room No. 22)
 - 3) Microbiology (Room No. 23)
 - 4) Biotechnology
Room No. 24
 - 5) chemistry. (Room No. 19)
 - 6) Physics. C
 - 7) Computerscience

- Bsc-II yr
- 1) Botany
 - 2) zoology
 - 3) Biotechnology
 - 4) microbiology
 - 5) Phys

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

DEPARTMENT OF BIOTECHNOLOGY

Add- On Course in "Basics Techniques in Plant Tissue Culture"

Course Highlight:

- ❖ *Well furnished Plant Tissue Culture Lab.*
- ❖ *All instruments required for Plant Tissue Available.*
- ❖ *Organization of Study tour to Commercial Plant Tissue Culture Labs (Atleast 2).*
- ❖ *Well Trained Faculty.*
- ❖ *Flexible time-table for all life sciences students.*
- ❖ *Hands on Practical training.*

Main Benefits of Plant Tissue Culture courses to the students:

- ❖ *Achieve knowledge in the highly specialized field of plant tissue culture studies and micro-propagation of native and exotic plants to produce vigorous growth.*
- ❖ *This program will provides participants with the skills and knowledge to prepare tools, propagation materials and the workspace using a range of tissue culture propagation techniques, understanding the appropriate growing environment and recording the propagation activities as well as research on plant material.*
- ❖ *Skills and knowledge gained in this course assist to get a career as: plant propagator, horticulture laboratory technician, botanist, plant nursery assistant/manager*

Contacts: 1. Mr. A.L. Upadhye

Co-Ordinator

Add-on course PTC

Mobile number: 9595210850

2. Ms. M.D. Uga

Mobile number: 9689966899

3. Ms. P.D. Patil

Mobile number 8007489706

"Basics Techniques in "Plant Tissue Culture"

Unit I

Introduction to plant tissue culture- Definition, History ,Cellular totipotency, techniques in plant tissue culture. **Infrastructure & Organization Of Plant Tissue Culture Laboratory- General and aseptic laboratory-** different work areas, equipments and instruments required, other requirements. **Aseptic Techniques-** Washing and preparation of glassware's, packing and sterilization, media sterilization, surface sterilization, aseptic workstation, precautions to maintain aseptic conditions. **Culture Medium-** Nutritional requirements of explant, PGR and their *invitro* roles, composition of basal M.S. medium and media preparation.

Unit II

Callus Culture Techniques- Introduction, principle, protocol, morphology and internal structure, genetic variations, applications. **Somatic Embryogenesis-** Introduction, principle, protocol, factors affecting, applications, limitations. **Organogenesis-** Introduction, principle, protocol, applications

Unit III

Anther & Pollen Culture Technique- Introduction, principle, protocol, factors affecting, applications. **Micropropagation-** Introduction, stages of Micropropagation, factors affecting, advantages and applications. **Different Pathways of Micropropagation-** Axillary bud proliferation, somatic embryogenesis, organogenesis, meristem culture.

Unit IV

Suspension Culture Technique- Introduction, principle, protocol, types, growth measurement, viability test, synchronization, applications. **Production of Secondary Metabolites-** Introduction, types of secondary metabolites, principle, systems of culture, optimization of yield, commercial aspects, applications, limitations=


CO-ORDINATOR
ADD-ON SERVICE



Practical for "Basic Techniques in Plant Tissue Culture"

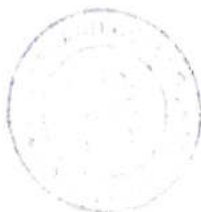
| Sr. No. | Name of the Practical | Practicals 06 |
|---------|---|---------------|
| 1 | Laboratory Organizations & general techniques. | 1 |
| 2 | Preparation of M.S. stock solutions & medium | 1 |
| 3 | Aseptic seed germination | 1 |
| 4 | Embryo culture technique. | 1 |
| 5 | Callus culture technique- Initiation of culture | 1 |
| 6 | Anther Culture technique. | 1 |

References:-

- 1) Introduction to plant tissue culture- M.K. Razdan
- 2) Plant tissue culture-Theory & practice-S.S.Bhojwani & M.K. Razdan
- 3) Micropropagation- Deberg & Zimmermann
- 4) Plant tissue culture-Kalyankumar Dey
- 5) Biotechnology- B.D. Singh
- 6) A text book of Biotechnology- R.C. Dubey
- 7) Plant tissue culture-U.Kumar
- 8) Plant cell, tissue & organ culture-Gam Borg & Phillips
- 9) Fundamentals of Biotechnology- S.S. Purohit
- 10) Plants cell Tissue & organ culture-Rennet & Bajaj
- 11] Biotechnology- H.S. Chawla
- 12] Crop Improvement In biotechnology- H.S.Chawla

CO-ORDINATOR
ADDITIONAL CHIEF

DEPARTMENT OF BOTANY
V.S. UNIVERSITY
BANGALORE



Add On Course Details

| Sr. No. | Name of the Course | Name of the Department | Duration of Course (hrs) | Maximum intake capacity | Name of Coordinator | Contact No. of Coordinator |
|---------|--|------------------------|--------------------------|-------------------------|---------------------|----------------------------|
| 1. | Basic Techniques in "Plant Tissue Culture" | Biotechnology | 30 hrs | 30 | Mr.A.L.Upadhye | +919595210850 |
| 2. | "Instrumentation Course in Life Science" | Biotechnology | 30 hrs | 30 | Miss.M.D.Ulape | +919689966899 |

Workload Distribution

| Name of Course | Name of Faculty | Workload of lectures | Workload of Practical | Total workload |
|--|-----------------|----------------------|-----------------------|----------------|
| Basic Techniques in "Plant Tissue Culture" | Mr. A.L.Upadhye | 10 | 4 | 14 |
| | Miss.M.D.Ulape | 10 | 3 | 13 |
| | Miss.P.D.Patil | 10 | 3 | 13 |
| "Instrumentation Course in Life Sciences" | Mr. A.L.Upadhye | 10 | 4 | 14 |
| | Miss.M.D.Ulape | 10 | 3 | 13 |
| | Miss.P.D.Patil | 10 | 3 | 13 |

COURSE OUTCOME: BASIC TECHNIQUES IN "PLANT TISSUE CULTURE"

Benefits of Plant Tissue Culture training/courses:

- Study plant tissue culture to enhance your current knowledge on plant formation, assist in the continued existence of vital species of plant life and increase your understanding of the structure of plants for personal or career enhancement.
- Achieve knowledge in the highly specialized field of plant tissue culture studies and micro-propagation of native and exotic plants to produce vigorous growth.
- This program will provides participants with the skills and knowledge to prepare tools, propagation materials and the workspace, use a range of tissue culture propagation techniques, understanding the appropriate growing environment, recording the propagation activities as well as researching plant material.
- Skills and knowledge gained in this course may lead to you to a career as: plant propagator, horticulture laboratory technician, botanist, plant nursery assistant/manager
- Students enrolled in a bachelor's degree program in plant biotechnology primarily study the genetic structures and mechanisms of various plants. They learn how to use the genetic makeup of plants to engineer solutions to health and environmental issues. For example, they might learn how to genetically engineer plants so that they carry more nutrition or are more sustainable in the environment.
- Students enrolled in a bachelor's degree program in this field study the basic concepts of botany, soil science, genetics, chemistry, microbiology, plant science and statistics.

Career options

Research facilities and food companies often hire plant biotechnologists at several levels. Some examples of entry-level careers in the field include:

- Plant biotechnology lab technician
- Biological engineer
- Plant and crop physiologist
- Plant pathologist
- Plant breeder

Students who graduate with a certificate in plant biotechnology can go on to work in several different positions in the fields of agriculture and food science. Those seeking to work in plant biology can choose from careers like:

1. A food science technician,
2. Plant biochemist, or
3. Agricultural manager.

They can work in many fields including:

1. Farming,
2. Industry, or
3. Teaching positions.

Generally, all positions require a bachelor's degree or advanced degree.

From pharmaceuticals to food sciences, the field of plant studies has wide-spanning applications in terms of career options. Three considerations for a career in plant biology include

1. Food science technician,
2. Plant Biochemist,
3. Agricultural manager.
4. Food Science Technician

Since plants are used as food, some graduates venture into the food industry as food scientists, also known as food technologists. They work to improve the way that food is developed. Their focus might often be in areas such as the processing, packaging and preserving of food. They may also work to create new food products.

2. Plant Biochemist

By studying the chemical makeup of plants, biochemists focus on biotechnology work in labs. They analyze the way plants grow, reproduce and metabolize when faced with various combinations of chemicals and compositions.

3. Agricultural Manager

Students interested in agricultural management typically work on a farm or ranch. A bachelor's degree is recommended to make a career in this field, through work experience and on-the-job training provide essential skills. Agricultural managers are concerned with the factors that affect crop growth and livestock management.

"Basic Techniques in Plant tissue Culture"

Attendance sheet of Add on Course

Teacher Name:- P. D. Patil.

| Particular of students | | Year - 2019. | | | | | | | | Dates of Lecture/Practical | | | |
|------------------------|---|--------------|--------|--------|---------|---------|---------|---------|---------|----------------------------|--|--|--|
| Sr No. | Name of the Students with Mobile Number of students | 2/1/19 | 3/1/19 | 9/1/19 | 10/1/19 | 16/1/19 | 17/1/19 | 23/1/19 | 24/1/19 | | | | |
| 1. | Sanmukh Ankita Banda 7447367187 | P | A | P | P | P | A | P | P | | | | |
| 2. | Angre Saloni Sasar 9370711100 | A | A | P | P | P | P | P | A | | | | |
| 3. | Mokshi Prithviraj Sanjay 6362869490 | P | P | P | P | P | P | P | A | | | | |
| 4. | Rangdal Rajat Jagdish 7028746377 | P | A | P | P | A | P | P | P | | | | |
| 5. | Shinde Shrutikirti Shahaji 9607032714 | P | P | P | P | P | P | P | P | | | | |
| 6. | Lambu Saloni Vijay 9588667128 | P | P | P | P | P | P | P | P | | | | |
| 7. | Dige Komal Tanaji 9075442261 | A | P | A | P | P | A | P | P | | | | |
| 8. | Patil Mahesh Sitaram 8378033660 | P | P | P | P | P | P | A | P | | | | |
| 9. | Kamble Sachin Sanjay 8552991326 | A | A | A | P | P | P | P | P | | | | |
| 10. | Jewrani Geeta R. 9834114046 | P | P | P | A | A | P | A | P | | | | |
| 11. | Lambe Utkarsha P. 7249766158 | P | A | P | P | A | P | A | P | | | | |

Vivekanand College, Kolhapur
Department of Biotechnology
"Basic Techniques in Plant tissue Culture"

Attendance sheet of Add on Course

Teacher Name:- M. D. Ulape

| Sr No. | Particular of students Name of the Students with Mobile Number of students | Year - 2019 | | Dates of Lecture/Practical | | | | | |
|--------|--|-------------|---------|----------------------------|--------|---------|---------|---------|---------|
| | | 30/1/19 | 31/1/19 | 6/2/19 | 7/2/19 | 13/2/19 | 14/2/19 | 20/2/19 | 21/2/19 |
| 1. | Sanmukh Ankita Banda 7447367187 | P | P | P | P | A | P | P | P |
| 2. | Angre Saloni Sasar 9370711100 | P | A | P | A | P | P | A | P |
| 3. | Mokshi Prithviraj Sanjay 6362869490 | A | P | P | A | P | A | P | P |
| 4. | Rangdal Rajat Jagdish 7028746377 | P | P | P | P | A | P | A | A |
| 5. | Shinde Shrutikirti Shahaji 9607032714 | A | P | A | P | P | A | P | P |
| 6. | Lambu Saloni Vijay 9588667128 | P | P | P | A | A | P | A | A |
| 7. | Dige Komal Tanaji 9075442261 | A | P | A | P | P | A | P | P |
| 8. | Patil Mahesh Sitaram 8378033660 | P | A | P | A | P | P | A | P |
| 9. | Kamble Sachin Sanjay 8552991326 | A | P | P | P | A | A | P | P |
| 10. | Jewrani Geeta R. 9834114046 | A | P | A | P | P | P | A | A |
| 11. | Lambe Utkarsha P. 7249766158 | P | P | P | A | P | A | A | A |

"Basic Techniques in Plant tissue Culture"

Attendance sheet of Add on Course

Teacher Name:- A L Upadhye.

| Sr No. | Particular of students Name of the Students with Mobile Number of students | Dates of Lecture/Practical | | | | | | | | | | | |
|--------|--|----------------------------|---------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| | | 27/2/19 | 28/2/19 | 6/3/19 | 7/3/19 | 13/3/19 | 14/3/19 | 20/3/19 | 21/3/19 | 27/3/19 | 28/3/19 | 29/3/19 | 30/3/19 |
| 1. | Sanmukh Ankita Banda 7447367187 | P | A | P | P | P | P | P | P | A | P | A | P |
| 2. | Angre Saloni Sasar 9370711100 | P | P | A | A | P | A | P | A | P | A | P | P |
| 3. | Mokshi Prithviraj Sanjay 6362869490 | P | P | P | P | A | P | P | P | P | A | P | P |
| 4. | Rangdal Rajat Jagdish 7028746377 | P | P | P | P | P | A | A | A | P | P | P | P |
| 5. | Shinde Shrutikirti Shahaji 9607032714 | P | P | P | P | P | P | P | A | P | A | P | A |
| 6. | Lambu Saloni Vijay 9588667128 | P | P | P | P | P | P | P | A | P | A | A | P |
| 7. | Dige Komal Tanaji 9075442261 | P | P | A | A | A | A | P | P | P | A | P | A |
| 8. | Patil Mahesh Sitaram 8378033660 | P | P | A | P | P | P | A | P | P | P | P | P |
| 9. | Kamble Sachin Sanjay 8552991326 | A | P | P | A | P | A | P | A | P | A | P | P |
| 10. | Jewrani Geeta R. 9834114046 | P | P | P | P | A | P | P | P | P | P | P | A |
| 11. | Lambe Utkarsha P. 7249766158 | P | P | P | P | P | P | A | P | P | P | P | P |

Vivekanand College, Kolhapur
Department of Biotechnology
"Basic Techniques in Plant tissue Culture"

Attendance sheet of Add on Course

Teacher Name:- S. S. Sutar

| Particular of students | | Dates of Lecture/Practical | | | | | | | | | | |
|------------------------|---|----------------------------|--------|---------|---------|---------|--|--|--|--|--|--|
| Sr No. | Name of the Students with Mobile Number of students | 3/4/19 | 4/4/19 | 10/4/19 | 11/4/19 | 18/4/19 | | | | | | |
| 1. | Sanmukh Ankita Banda 7447367187 | P | A | P | P | P | | | | | | |
| 2. | Angre Saloni Sasar 9370711100 | P | P | P | A | A | | | | | | |
| 3. | Mokshi Prithviraj Sanjay 6362869490 | P | A | P | P | P | | | | | | |
| 4. | Rangdal Rajat Jagdish 7028746377 | P | P | P | A | P | | | | | | |
| 5. | Shinde Shrutikirti Shahaji 9607032714 | A | P | P | P | P | | | | | | |
| 6. | Lambu Saloni Vijay 9588667128 | P | P | P | P | A | | | | | | |
| 7. | Dige Komal Tanaji 9075442261 | P | P | A | P | P | | | | | | |
| 8. | Patil Mahesh Sitaram 8378033660 | P | P | P | P | P | | | | | | |
| 9. | Kamble Sachin Sanjay 8552991326 | P | A | P | P | P | | | | | | |
| 10. | Jewrani Geeta R. 9834114046 | P | P | A | P | P | | | | | | |
| 11. | Lambe Utkarsha P. 7249766158 | P | A | P | P | P | | | | | | |

Date:- 20/4/2019

Notice

All the students of Add on Course on “**Basic Techniques in Plant Tissue Culture**” are hereby informed that their final exam for theory and practical exam will be held on 28/04/2019.

The schedule for the Examination:

| Sr No | Particulars | Time |
|-------|-------------|----------------------|
| 1. | Theory | 10:00 am to 11:00 am |
| 2. | Practicals | 11:00 am to 04:00pm |



Co ordinator

Add- on Course

CO-ORDINATOR
ADD-ON COURSE
DEPARTMENT OF BIOTECHNOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



HEAD

Department of Biotechnology (Entire/Optional)
Vivekanand College, Kolhapur.
Head

Vivekanand College, Kolhapur
Department of Biotechnology

Attendance sheet of Add on Course in "Basic Techniques in Plant tissue Culture"

Examination 2018-2019

Date: 28/04/2019

| Sr No. | Name of the Students with Mobile Number of students | Signature |
|--------|---|-----------|
| 1. | Sanmukh Ankita Banda 7447367187 | Absent. |
| 2. | Angre Saloni Sasar 9370711100 | Angre |
| 3. | Mokshi Prithviraj Sanjay 6362869490 | Mokshi |
| 4. | Rangdal Rajat Jagdish 7028746377 | Rangdal |
| 5. | Shinde Shrutikirti Shahaji 9607032714 | Shruti |
| 6. | Lambu Saloni Vijay 9588667128 | Lambu. |
| 7. | Dige Komal Tanaji 9075442261 | Dige |
| 8. | Patil Mahesh Sitaram 8378033660 | Patil |
| 9. | Kamble Sachin Sanjay 8552991326 | Kamble |
| 10. | Jewrani Geeta R. 9834114046 | Geeta R.S |
| 11. | Lambe Utkarsha P. 7249766158 | Lambe |

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

-
- Instructions:** - 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagram wherever necessary.
-

Name of the Students: _____

Q 1. Select the correct alternative and rewrite the sentence (30) marks

1. The growth of plant tissues in artificial media is called _____
 - a) Gene expression
 - b) Transgenesis
 - c) Plant tissue culture
 - d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
 - a) Unipotent
 - b) Pluripotent
 - c) Multipotent
 - d) Totipotency
3. Which of the following is NOT a plant growth regulator?
 - a) Auxin
 - b) Cytokinins
 - c) Abscisic acid
 - d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
 - a) Ethylene
 - b) Auxin
 - c) Gibberellins
 - d) Abscisic acid
5. Plant materials are surface sterilized by _____.
 - a) $HgCl_2$
 - b) NaCl
 - c) NaOH
 - d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
 - a) Plasmid
 - b) Cosmid
 - c) Phasmid
 - d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
 - a) Xylem vessels
 - b) Sieve tube
 - c) Meristem
 - d) Cork cells

- 8). Growth hormone producing apical dominance is
- Auxin
 - Gibberellin
 - Ethylene
 - Cytokinin
- 9). Part of plant used for culturing is called
- Scion
 - Explant
 - Stock
 - Callus
- 10). Hormone pair required for a callus to differentiate are
- Auxin and cytokinin
 - Auxin and ethylene
 - Auxin and abscisic acid
 - Cytokinins and gibberellin
- 11). The production of secondary metabolites require the use of
- Protoplast
 - Cell suspension
 - Meristem
 - Auxillary buds
- 12). What is/are the benefit(s) of micro propagation or clonal propagation?
- Rapid multiplication of superior clones
 - Multiplication of disease free plants
 - Multiplication of sexually derived sterile hybrids
 - All of the above
- 13). Plant tissue culture technique is a redefined method of _____
- Hybridization
 - Vegetative Propagation
 - Asexual Reproduction
 - Selection
- 14). Which of the following is considered as the disadvantage of conventional plant tissue culture for clonal propagation?
- Multiplication of sexually derived sterile hybrids
 - Less multiplication of disease free plants
 - Storage and transportation of propagates
 - Both (b) and (c)
- 15). The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as
- Redifferentiation
 - Dedifferentiation
 - either (a) or (b)
 - none of these

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course Examination (2018-2019) April 2019

Subject: Basic Techniques in Plant tissue Culture (Practical)

Date:28/04/19

Time:12:00 am to 04:00 pm

Total Marks: 70

-
- Instructions: -**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

Q.1. Major

(30) Marks

Demonstrate the technique of **Anther culture**.

OR

Demonstrate the technique of inoculation for **Aseptic seed germination**.

OR

Demonstrate the technique of inoculation for initiation of **Callus culture**.

Q.2.Minor

(20) Marks

Proceed for surface sterilization of given **Floral bud** .

OR

Proceed for surface sterilization of given **Seed material**.

OR

Proceed for surface sterilization of given **Leaf (Tissue)**.

Q.3.Viva.voice

(20) Marks

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

24
30

Name of the Students: Angre Saloni Sadar

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
 - a) Gene expression
 - b) Transgenesis
 - c) Plant tissue culture
 - d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
 - a) Unipotent
 - b) Pluripotent
 - c) Multipotent
 - d) Totipotency
3. Which of the following is NOT a plant growth regulator?
 - a) Auxin
 - b) Cytokinins
 - c) Abscisic acid
 - d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
 - a) Ethylene
 - b) Auxin
 - c) Gibberellins
 - d) Abscisic acid
5. Plant materials are surface sterilized by _____.
 - a) $HgCl_2$
 - b) NaCl
 - c) NaOH
 - d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
 - a) Plasmid
 - b) Cosmid
 - c) Phasmid
 - d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
 - a) Xylem vessels
 - b) Sieve tube
 - c) Meristem
 - d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

Name of the Students: Dige Komal Tanaji

28

30

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
 - a) Gene expression
 - b) Tran genesis
 - c) Plant tissue culture
 - d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
 - a) Unipotent
 - b) Pluripotent
 - c) Multipotent
 - d) Totipotency
3. Which of the following is NOT a plant growth regulator?
 - a) Auxin
 - b) Cytokinins
 - c) Abscisic acid
 - d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
 - a) Ethylene
 - b) Auxin
 - c) Gibbrellins
 - d) Abscisis acid
5. Plant materials are surface sterilized by _____
 - a) $HgCl_2$
 - b) NaCl
 - c) NaOH
 - d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
 - a) Plasmid
 - b) Cosmid
 - c) Phasmid
 - d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
 - a) Xylem vessels
 - b) Sieve tube
 - c) Meristem
 - d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: - 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagram wherever necessary.

26
30

Name of the Students: mokashi pruthi^{viral} samjay

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Transgenesis
c) Plant tissue culture
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
a) Unipotent
b) Pluripotent
c) Multipotent
d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
b) Cytokinins
c) Abscisic acid
d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
a) Ethylene
b) Auxin
c) Gibberellins
d) Abscisic acid
5. Plant materials are surface sterilized by _____
a) $HgCl_2$
b) NaCl
c) NaOH
d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
a) Plasmid
b) Cosmid
c) Phasmid
d) Agrobacterium.
7. Which of the following plant cell will show totipotency?
a) Xylem vessels
b) Sieve tube
c) Meristem
d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR
Add on course 2018-19 Examination April 2019
Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

Name of the Students: Rajat Jagdish Rangdal

Q 1. Select the correct alternative and rewrite the sentence (30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Tran genesis
c) Plant tissue culture
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
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b) Pluripotent
c) Multipotent
d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
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c) Abscisic acid
d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
a) Ethylene
b) Auxin
c) Gibbrellins
d) Abscisis acid
5. Plant materials are surface sterilized by _____
a) $HgCl_2$
b) NaCl
c) NaOH
d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
a) Plasmid
b) Cosmid
c) Phasmid
d) Agrobacterium.
7. Which of the following plant cell will show totipotency?
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VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

Name of the Students: Ankita Banda Sanmukh

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Tran genesis
c) Plant tissue culture
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
a) Unipotent
b) Pluripotent
c) Multipotent
d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
b) Cytokinins
c) Abscisic acid
d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
a) Ethylene
b) Auxin
c) Gibbrellins
d) Abscisis acid
5. Plant materials are surface sterilized by _____
a) $HgCl_2$
b) NaCl
c) NaOH
d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
a) Plasmid
b) Cosmid
c) Phasmid
d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
a) Xylem vessels
b) Sieve tube
c) Meristem
d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

30
30

Name of the Students: shinde shoutikirti shahaji

19

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
 - a) Gene expression
 - b) Tran genesis
 - c) Plant tissue culture
 - d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
 - a) Unipotent
 - b) Pluripotent
 - c) Multipotent
 - d) Totipotency
3. Which of the following is NOT a plant growth regulator?
 - a) Auxin
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 - c) Abscisic acid
 - d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
 - a) Ethylene
 - b) Auxin
 - c) Gibbrellins
 - d) Abscisis acid
5. Plant materials are surface sterilized by _____
 - a) HgCl₂
 - b) NaCl
 - c) NaOH
 - d) CaCl₂
6. Which vector is mostly used in crop improvement?
 - a) Plasmid
 - b) Cosmid
 - c) Phasmid
 - d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
 - a) Xylem vessels
 - b) Sieve tube
 - c) Meristem
 - d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

26
30

Name of the Students: Lambe utkalsha P

13

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Tran genesis
✓ c) Plant tissue culture
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
a) Unipotent
b) Pluripotent
c) Multipotent
✓ d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
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c) Abscisic acid
✓ d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
a) Ethylene
b) Auxin
c) Gibbrellins
d) Abscisis acid
5. Plant materials are surface sterilized by _____.
✓ a) HgCl₂
b) NaCl
c) NaOH
d) CaCl₂
6. Which vector is mostly used in crop improvement?
a) Plasmid
b) Cosmid
c) Phasmid
✓ d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
a) Xylem vessels
b) Sieve tube
✓ c) Meristem
d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

28
30

Name of the Students: Kamble Sachin Sanjay

15

Q 1. Select the correct alternative and rewrite the sentence (30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Transgenesis
✓ c) Plant tissue culture
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
a) Unipotent
b) Pluripotent
c) Multipotent
✓ d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
b) Cytokinins
c) Abscisic acid
✓ d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
✓ a) Ethylene
b) Auxin
c) Gibberellins
d) Abscisic acid
5. Plant materials are surface sterilized by _____
✓ a) $HgCl_2$
b) NaCl
c) NaOH
d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
a) Plasmid
b) Cosmid
c) Phasmid
✓ d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
a) Xylem vessels
b) Sieve tube
✓ c) Meristem
d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

Subject: Basic Techniques in Plant tissue Culture (Theory)

Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

26

30

Name of the Students: Patil Mahesh Sitaram

Q 1. Select the correct alternative and rewrite the sentence

(30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Tran genesis
✓ c) Plant tissue culture
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
a) Unipotent
b) Pluripotent
c) Multipotent
✓ d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
b) Cytokinins
c) Abscisic acid
✓ d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
a) Ethylene
b) Auxin
✓ c) Gibbrellins
d) Abscisis acid
5. Plant materials are surface sterilized by _____
✓ a) $HgCl_2$
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d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
✓ a) Plasmid
b) Cosmid
c) Phasmid
d) Agrobacterium.
- 7). Which of the following plant cell will show totipotency?
a) Xylem vessels
b) Sieve tube
✓ c) Meristem
d) Cork cells

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Add on course 2018-19 Examination April 2019

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Date: 28/04/19

Time: 11:00 am to 12:00 pm

Total Marks: 30

- Instructions: -
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat labeled diagram wherever necessary.

28
30

Name of the Students: Jewroni Geeta R.

Q 1. Select the correct alternative and rewrite the sentence (30) marks

1. The growth of plant tissues in artificial media is called _____
a) Gene expression
b) Transgenesis
 c) Plant tissue culture ✓
d) Cell hybridization
2. Name the term given to the ability of single cells to divide and produce the entire differentiated cell in the organism?
a) Unipotent
b) Pluripotent ✓
c) Multipotent
 d) Totipotency
3. Which of the following is NOT a plant growth regulator?
a) Auxin
b) Cytokinins
c) Abscisic acid ✓
 d) Polyphenols
4. Which of the following plant hormone control fruit ripening?
 a) Ethylene ✓
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c) Gibberellins
d) Abscisic acid
5. Plant materials are surface sterilized by _____
 a) $HgCl_2$ ✓
b) NaCl
c) NaOH
d) $CaCl_2$
6. Which vector is mostly used in crop improvement?
a) Plasmid
b) Cosmid
c) Phasmid
 d) Agrobacterium. ✓
7. Which of the following plant cell will show totipotency?
a) Xylem vessels
b) Sieve tube
 c) Meristem ✓
d) Cork cells

Vivekanand College, Kolhapur
Department of Biotechnology
"Basic Techniques in Plant tissue Culture"

Feedback Form of Add on Course

Teacher Name:- Mr.A.L.Upadhye

Ms M.D.Ulpae

Ms P.D.Patil

Mr. S.S.Sutar

Rate your feed back as: 1 Excellent, 2 Very Good, 3. Good, 4. Fair, 5. Not up to the Mark

1. Quality of teaching/Teacher Excellent
2. Syllabus Excellent
3. Study tour Excellent
4. Practicals Excellent
5. Examination Excellent
6. Suggestion for future development of course Not required.

7. Certificate _____

General Feed Back Excellent teaching skill, nice
practical, more practical knowledge
provided, Nice tour facility in
less expenses.

Name of the student and Class: Sarvrukh Ankita Banda
Class- B.Sc II Biotech (opt)

Vivekanand College, Kolhapur
Department of Biotechnology
"Basic Techniques in Plant tissue Culture"

Feedback Form of Add on Course

Teacher Name:- Mr.A.L.Upadhye

Ms M.D.Ulpae

Ms P.D.Patil

Mr. S.S.Sutar

Rate your feed back as: 1 Excellent, 2 Very Good, 3. Good, 4. Fair, 5. Not up to the Mark

1. Quality of teaching/Teacher Excellent

2. Syllabus Very Good

3. Study tour Excellent

4. Practicals Excellent

5. Examination Good

6. Suggestion for future development of course My Suggestion is that, to improve practical syllabus, for more experience.

7. Certificate Excellent

General Feed Back The course was excellent. It help us to increase the knowledge regarding Plant tissue culture. By doing this, it give us the confidence of doing work in PTC lab.

Name of the student and Class:

Geeta Rajkumar Tewrani B.Sc. II
(Plane).

Vivekanand College, Kolhapur
Department of Biotechnology
"Basic Techniques in Plant tissue Culture"
Feedback Form of Add on Course

Teacher Name:- Mr.A.L.Upadhye

Ms M.D.Ulpae

Ms P.D.Patil

Mr. S.S.Sutar

Rate your feed back as: 1 Excellent, 2 Very Good, 3. Good, 4. Fair, 5. Not up to the Mark

1. Quality of teaching/Teacher Excellent

2. Syllabus Very Good

3. Study tour Excellent

4. Practicals Very Good

5. Examination Good

6. Suggestion for future development of course _____

To Improve the practical syllabus and Practicals.

7. Certificate Excellent

General Feed Back _____

The coc-PTC course is very excellent.

It is useful for our education as well as
life.

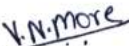
Name of the student and Class: Saloni Sardar Angre
B.Sc II (Plan)


Vivekanand College, Kolhapur
Department of Biotechnology
Add-On Course: "Basic Techniques in Plant tissue Culture"
Practical and Theory Examination 2019 Mark sheet

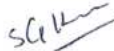
Date: 28/04/2019

| Sr No. | Name of the Students with Mobile Number of students | Q1 Major (30) | Q2 Minor (20) | Q3 viva (20) | Practical Total (out of 70) | Theory Total (Out of 30) | Total (out of 100) |
|--------|---|---------------|---------------|--------------|-----------------------------|--------------------------|--------------------|
| 1. | Sanmukh Ankita Banda | Absent | Absent | Absent | Absent | Absent ₂₂ | Absent |
| 2. | Angre Saloni Sadar | 20 | 15 | 16 | 51 | 24 | 75 |
| 3. | Mokashi Prithviraj Sanjay | 22 | 14 | 13 | 49 | 26 | 75 |
| 4. | Rangdal Rajat Jagdish | 25 | 17 | 15 | 57 | 22 | 79 |
| 5. | Shinde Shrutikirti Shahaji | 21 | 18 | 16 | 55 | 30 | 85 |
| 7. | Dige Komal Tanaji | 23 | 18 | 14 | 55 | 28 | 83 |
| 8. | Patil Mahesh Sitaram | 21 | 17 | 14 | 52 | 26 | 78 |
| 9. | Kamble Sachin Sanjay | 25 | 17 | 14 | 56 | 28 | 84 |
| 10. | Jewrani Geeta R. | 22 | 16 | 16 | 54 | 26 | 80 |
| 11. | Lambe Utkarsha P. | 25 | 15 | 14 | 54 | 26 | 80 |


 Co Ordinator
 Add-On course PTC


 V.N. More
 1.Examiner
 (Practical)


 2.Examiner
 (Theory)


 Heads
 (Biotechnology Department)



- Dr Babuji Salunkhe



Shri Swami Vivekanand Shikshan Sanstha's
**VIVEKANAND COLLEGE (AUTONOMOUS),
KOLHAPUR**



Department of Biotechnology

Certificate

This is certified that Mr./Ms. Rajat Jagdish Rangdal from B.Sc-III Biotech (Entire) as
Successfully completed the Add-on course on "Basic Techniques in Plant Tissue Culture" carried out in the
Department Of Biotechnology, Vivekanand College, Kolhapur. This certificate is awarded to him/her after passing
in the theory and practical Examination held on 28/04/2019 at Department of Biotechnology.

[Signature]
Course Co-ordinator
DEPARTMENT OF BIOTECHNOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



[Signature]
Head (Entire & Optional)
DEPARTMENT OF BIOTECHNOLOGY (ENTIRE)
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

[Signature]
Dean

[Signature]
Principal