



BIOLOGY

BOOKS - SARAS PUBLICATION

Plant Tissue Culture

Exercise

1. (i) Define tissue culture.

(ii) Explain the basic concepts involved in plant tissue culture.



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2. Define tissue culture.



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3. What is pomato?



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4. What is Agar? Mention its role in plant tissue culture.



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5. What is a callus?



[Watch Video Solution](#)

6. What is hardening?



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7. What are secondary metabolites?



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8. Define somaclonal variations.



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9. Define gametoclonal variations.



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10. Define cell culture.



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11. What is chemically defined medium?



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12. Comment on cybrid.



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13. What is ELSI?



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Exercise

1. The time duration for sterilization process by using autoclave is _____ minutes and the temperature is _____

A. 10 to 30 minutes and ○ 125C

B. 15 to 30 minutes and $\circ 125^{\circ}\text{C}$

C. 15 to 20 minutes and $\circ 125^{\circ}\text{C}$

D. 10 to 20 minutes and $\circ 121^{\circ}\text{C}$

Answer:



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2. Select the incorrect statement from given statement.

- A. A tonic used for cardiac arrest is obtained from *Digitalis purpurea*
- B. Medicine used to treat Rheumatic pain is extracted from *Capsicum annum*
- C. An anti malarial drug is isolated from *Cinchona officinalis*
- D. Anti carcinogenic property is not seen in *Catharanthus roseus*

Answer:



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3. Solidifying agent used in plant tissue culture is

- A. Nicotinic acid
- B. Cobaltous chloride
- C. EDTA
- D. Agar

Answer:



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4. Which one is not a secondary metabolite?

A. Alkaloid

B. Phenolic compound

C. Citric acid

D. Codeine

Answer:



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5. Identify the correct order

Embryo

Explant in nutrient medium

Callus

Plantlet

A. Embryo

B. Explant in nutrient medium

C. Callus

D. Plantlet

Answer:



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6. How will you avoid the growing of microbes in nutrient medium during culture process?

What are the techniques used to remove the microbes?



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7. Give the examples for micro propagation performed plants.





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8. Explain the basic concepts involved in plant tissue culture.



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9. Define somaclonal variations.



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10. What does RCGM stand for?

What its function.



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11. What are the steps taken to sterilize the culture room in plant tissue culture?



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12. Write the various steps involved in cell suspension culture.



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13. What do you mean by Embryoids? Write its application.



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14. Give an account on cryopreservation.



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15. Mention two potential risks involved in Biosafety.



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16. What is GEAC?.

Mention its role.



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17. What do you mean by Germplasm conservation? Describe it.



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18. List out the organizations that have implemented the biosafety guidelines.



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19. You are given a shoot tip. How will you culture it into a plant?



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20. Totipotency refers to

- A. Capacity to generate genetically identical plants.
- B. Capacity to generate a whole plant from any plant cell/explant.

C. Capacity to generate hybrid protoplasts

D. Recovery of healthy plants from diseased plants.

Answer:



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21. Micro propagation involves

A. Vegetative multiplication of plants by using micro-organisms.

B. Vegetative multiplication of plants by using small explants.

C. Vegetative multiplication of plants by using microspores.

D. Non-vegetative multiplication of plants by using microspores and megaspores.

Answer:



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22. Match the following:

Column A	Column B
1) Totipotency	A) Reversion of mature cells into meristem

2) Dedifferentiation	B) Biochemical and structural changes of cells
3) Explant	C) Properties of living cells develops into entire plant
4) Differentiation	D) Selected plant tissue transferred to culture medium

A. 1-C 2-A 3-D 4-B

B. 1-A 2-C 3-B 4-D

C. 1-B 2-A 3-D 4-C

D. 1-D 2-B 3-C 4-A

Answer:



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23. The time duration for sterilization process by using autoclave is _____ minutes and the temperature is _____

A. 10 to 30 minutes and $125^{\circ} C$

B. 15 to 30 minutes and $121^{\circ}C$

C. 15 to 20 minutes and $125^{\circ}C$

D. 10 to 20 minutes and $121^{\circ}C$

Answer:



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24. Which of the following statement is correct?

- A. Agar is not extracted from marine algae such as seaweeds.
- B. Callus undergoes differentiation and produces somatic embryoids
- C. Surface sterilization of explants is done by using mercuric bromide
- D. P^H of the culture medium is 5.0 to 6.0

Answer:



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25. Select the incorrect statement from given statement.

A. A tonic used for cardiac arrest is obtained from *Digitalis purpurea*

B. Medicine used to treat Rheumatic pain is extracted from *Capsicum annum*

C. An anti malarial drug is isolated from *Cinchona officinalis*.

D. Anti-carcinogenic property is not seen in *Cartharanthus roseus*.

Answer:



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26. Virus free plants are developed from

- A. Organ culture
- B. Meristem culture
- C. Protoplast culture
- D. Cell suspension culture

Answer:



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27. The prevention of large scale loss of biological integrity is

A. Biopatent

B. Bioethics

C. Biosafety

D. Biofuel

Answer:



28. Cryopreservation means it is a process to preserve plant cells, tissues or organs

A. at very low temperature by using ether.

B. at very high temperature by using liquid nitrogen

C. at very low temperature of -196 by using liquid nitrogen

D. at very low temperature by using liquid
nitrogen

Answer:



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29. Solidifying agent used in plant tissue culture is

A. Nicotinic acid

B. Cobaltous chloride

C. EDTA

D. Agar

Answer:



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30. Tissue culture is also known as

A. In vivo growth of cells

B. In vitro growth of cells

C. Coventional method

D. Traditional method

Answer:



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31. Who proposed the concept of Totipotency?

A. Gottlieb Haberlandt

B. Martin

C. P.R. White

D. F.C. Steward

Answer:



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32. The intergeneric hybrid plant pomato was developed by.

A. Guha

B. Maheshwari

C. Chilton

D. Melchers

Answer:



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33. Identify the wrongly matched pair

A. F.C. Steward-Use of coconut water in tissue culture.

B. P.R. White-Root culture

C. Morel and Martin-Test tube fertilization

D. Chilton-Transformed tobacco from single
cell transformation

Answer:



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34. Virus free Dahlia and potato plants are
developed by.

A. Horsch

B. Morel and Martin

C. P.R. White

D. Yamada

Answer:



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35. In vitro production of haploid embryos from anther of *Datura* was developed by.

A. Haberlandt

B. Guha and Maheshwari

C. Vasil

D. Hildebrandt

Answer:



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36. Which of the following was produced by Kanta et al in 1962?

A. Test-tube fertilization in flowering plants

B. Regenerated tobacco plants

C. Formulation of tissue culture medium

D. Root culture

Answer:



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37. Tissue culture medium was formulated by.

A. P.R. White

B. Vasil and Hildbrandt

C. Murashige and Skoog

D. Carlson

Answer:



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38. Who is called the father of tissue culture?

Why?

A. Bonner

B. Haberlandt

C. Steward

D. Kanta

Answer:



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39. Part of plant or tissue used for culturing is called.

A. Scion

B. Explant

C. Stock

D. Callus

Answer:



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40. Which of the following is used for the sterilization of culture room?

A. Mercuric chloride

B. Sulphuric acid

C. Nitric acid

D. Sodium hypochlorite

Answer:



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41. Which of the following nutrient medium is commonly used for plant tissue culture?

A. MS medium

B. B5 medium

C. White medium

D. Nitsch's medium

Answer:



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42. Agar is obtained from

A. Land algae

B. Marine algae

C. Land Lichens

D. Marine Lichens

Answer:



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43. The suitable pH of tissue culture medium is

A. 3.6 to 4.0

B. 4.6 to 5.0

C. 5.6 to 6.0

D. 6.6 to 7.0

Answer:



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44. The constant temperature for tissue culture.

A. $20^{\circ} C \pm 2^{\circ} C$

B. $25^{\circ} C \pm 2^{\circ} C$

C. $30^{\circ} C \pm 2^{\circ} C$

D. $35^{\circ} C \pm 2^{\circ} C$

Answer:



45. A mass of unorganized growth of plant cells are called.

A. Callus

B. Thallus

C. Plantlet

D. Organ

Answer:



46. Which one of the following is not a micronutrient?

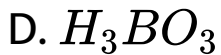
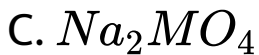
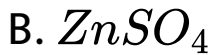
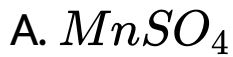
- A. Zinc sulphate
- B. Ammonium nitrate
- C. Potassium nitrate
- D. Calcium chloride

Answer:



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47. Identify the minor nutrient found in MS medium?



Answer:



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48. Match the following:

- | | |
|------------|---------------------|
| 1. Callus | - A. Growth hormone |
| 2. PEG | - B. Iron stock |
| 3. NaEDTA | - C. Fusogen |
| 4. Kinetin | - D. Mass of cells |

A. 1-B, 2-D, 3-A, 4-C

B. 1-D, 2-C, 3-A, 4-B

C. 1-D, 2-C, 3-B, 4-A

D. 1-C, 2-A, 3-D, 4-B

Answer:



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49. The plant cell walls are digested by.

- A. Protein mixtures
- B. Vitamin mixtures
- C. Enzyme mixtures
- D. Hormonal mixtures

Answer:



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50. The isolated protoplasts are transferred to.....solution to retain their viability.

A. Ethanol

B. Sucrose

C. Agar

D. Mannitol

Answer:



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51. The first step in protoplast culture is

- A. Fusion of protoplast
- B. Culture of protoplasts
- C. Selection of somatic hybrid cells
- D. Isolation of protoplast

Answer:



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52. The fused protoplast viability is tested with.

A. Fluorescein diacetate

B. Sucrose solution

C. Polyethylene Glycol

D. Phenolic compound

Answer:



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53. Fusion product of protoplast without nucleus _____.

A. Hybrid

B. Cybrid

C. Callus

D. Thallus

Answer:



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54. Which of the following is isolated from *Catharanthus roseus*?

A. Capsaicin

B. Digoxin

C. Indole alkaloid

D. Quinine

Answer:



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55. Match the following and select the correct option.

- | | | |
|----------------|---|-----------------------------|
| 1. Digoxin | - | A. Rheumatic pain treatment |
| 2. Codeine | - | B. Anti carcinogenic |
| 3. Capsaicin | - | C. Cardiac tonic |
| 4. Vincristine | - | D. Analgesic |

A. 1-C, 2-D, 3-A, 4-B

B. 1-D, 2-A, 3-B, 4-C

C. 1-B, 2-D, 3-A, 4-C

D. 1-C, 2-B, 3-A, 4-D

Answer:





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56. Which one is not a secondary metabolite?

- A. Alkaloid
- B. Phenolic compound
- C. Citric acid
- D. Codeine

Answer:



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57. The ability of the component cells to callus to form a whole plant is known as

- A. Redifferentiation
- B. Dedifferentiation
- C. Differentiation
- D. None of these

Answer:



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58. Which of the following plant cell will show totipotency?

- A. Xylem vessels
- B. Phloem vessels
- C. Meristem
- D. Sieve tubes

Answer:



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59. The plant source of codeine is

- A. *Digitalis purpurea*
- B. *Papaver somniferum*
- C. *Capsicum annum*
- D. *Catharanthus roseus*

Answer:



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60. Which of the following is always free from viruses?

- A. Shoot meristem tip
- B. Root meristem tip
- C. Central meristem
- D. Peripheral meristem

Answer:



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61. The temperature of cryopreservation is.

A. (-) $180^{\circ} C$

B. (-) $185^{\circ} C$

C. (-) $196^{\circ} C$

D. (-) $200^{\circ} C$

Answer:



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62. Match the following and select the correct option.

- | | |
|------------------------|------------------------|
| 1. Dimethyl sulphoxide | - A. Growth hormone |
| 2. Myo- inositol | - B. Minor nutrient |
| 3. Cobaltous chloride | - C. Solidifying agent |
| 4. Agar | - D. Cryoprotectant |

A. 1-C, 2-B, 3-D, 4-A

B. 1-D, 2-A, 3-B, 4-C

C. 1-B, 2-D, 3-C, 4-A

D. 1-D, 2-C, 3-B, 4-A

Answer:



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63. Which of the following statement is correct?

A. Somaclonal variations found in gametes

B. Shoot meristem tip culture is the method to produce virus-free plants

C. Protective agents are added after cryopreservation

D. Cell suspension culture can be useful for the production of primary metabolites

Answer:



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64. Identify the correct order

In vitro culture

Organogenesis

Apical meristem

Cultures are maintained at $24 \pm 1^\circ C$

A. ii, I, iv, iii,

B. iv, ii, ii, i

C. iii, I, iv, ii

D. iii, iv, ii, I

Answer:



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65. The term 'intellectual property Right' covers

- A. Copyright
- B. Trademark
- C. Trade secrets
- D. all of the above

Answer:



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66. Which of the following is a signed document?

A. The claim

B. The great

C. The specification

D. None of the above

Answer:



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67. The prevention of large scale loss of biological integrity is

A. Biosafety

B. Bioethics

C. Patent

D. Specification

Answer:



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68. Which of the following monitors the risky research activities in the laboratories?

A. GEAC

B. RCGM

C. IBSC

D. DBT

Answer:



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69. Which of the following monitors the risky research activities in the laboratories?

A. IPR

B. GEAC

C. IBSC

D. RCGM

Answer:



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70. Which of the following is the main effect of cytokines in the tissue culture system?

- A. Adventitious shoot formation
- B. Induction of somatic embryos
- C. Adventitious root formation
- D. Shoot elongation

Answer:



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71. The embryo developed from the callus is called.

A. Cybrid

B. Hybrid

C. Embyoid

D. Plantler

Answer:



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72. The time duration for the protoplast to synthesis new cell wall is.

A. 12-24 hours

B. 24-48 hours

C. 3-4 days

D. 5-7 days

Answer:



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73. In protoplast culture, the first division of new cells occurs between.....

A. 2 – 3

B. 2 – 4

C. 2 – 6

D. 2 – 7

Answer:



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74. The growing of cells in vitro in liquid medium is known as

- A. Protoplast culture
- B. Cell suspension culture
- C. Organ culture
- D. Meristem culture

Answer:



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75. The plant source of digoxin is

- A. *Digitalis purpurea*
- B. *Papaver somniferum*
- C. *Capsicum annum*
- D. *Catharanthus roseus*

Answer:



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76. The composition of Ammonium nitrate in MS medium is.

A. 1900.0mg/l

B. 440.0mg/l

C. 1650.0mg/l

D. 370.0mg/l

Answer:



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77. Identify the correct order

Embryo

Explant in nutrient medium

Callus

Plantlet

A. iv, ii, iii, I

B. ii, iii, I, iv

C. ii, iv, iii, I

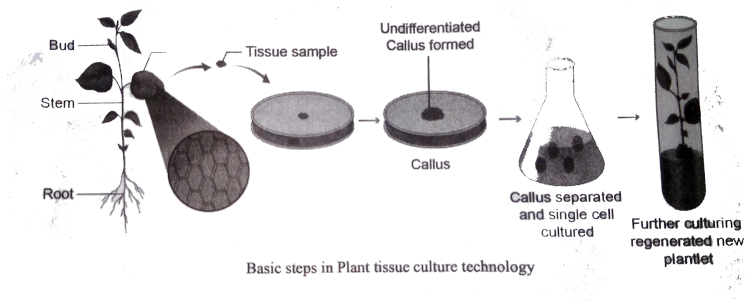
D. iii, I, ii, iv

Answer:



Example

1. What is the name of the process given below? Write its 4 types.



2. How will you avoid the growing of microbes in nutrient medium during culture process?

What are the techniques used to remove the microbes?



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3. Write the various steps involved in cell suspension culture.



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4. What do you mean by Embryoids? Write its application.



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5. Explain the basic concepts involved in plant tissue culture.



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6. Give an account on cryopreservation.





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7. What do you mean by Germplasm conservation? Describe it.



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8. Write the protocol for artificial seed preparation.



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9. Based on the material used, how will you classify the culture technology?



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10. HEPA stand for

- A. High Efficiency Particulate Air
- B. High Effective Parts of Air remover
- C. High Effective Particles of Air
- D. High Efficiency Particle Air

Answer:



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11. Define plant tissue culture.



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12. Write the steps to sterilize the explants in plant tissue culture?



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13. What are the steps taken to sterilize the culture room in plant tissue culture?



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14. Define tissue culture.



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15. What does in vitro mean?



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16. Who is called the father of tissue culture?

Why?



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17. What is pomato?



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18. List out the three fundamental principles of plant tissue culture.



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19. What is an agar?



Watch Video Solution

20. What is a callus?



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21. Write about the culture conditions to be maintained in plant tissue culture.



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22. What is hardening?



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23. Point out the factors that determine success rate of tissue culturing.



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24. Name the culture medium commonly used for tissue culture.



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25. List out the media available for plant tissue culture and their contribution.



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26. Give examples of secondary metabolites in plants.



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27. Define secondary metabolites.



Watch Video Solution

28. Define somaclonal variations.



Watch Video Solution

29. Define gametoclonal variations.



Watch Video Solution

30. Write a note on hardening technique in plant tissue culture.



Watch Video Solution

31. What is chemically defined medium?



Watch Video Solution

32. Comment on cybrid.



Watch Video Solution

33. How will you remove the microbes from nutrient medium?



Watch Video Solution

34. List out the organizations that have implemented the biosafety guidelines.



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35. Expand IBC's and mention its function.



Watch Video Solution

36. What does RCGM stand for?

What its function.



Watch Video Solution

37. What is GEAC?.

Mention its role.



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38. Describe the sterilization technique to maintain aseptic environment in plant tissue culture.



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39. Write a note on patents.



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40. Draw the flow chart of general steps in patenting.



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41. What is ELSI?



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42. List out the impact of biotechnology in our future.





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43. Define protoplast culture



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44. How will you get pure protoplast?



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45. (a) Explain the steps involved in protoplast culture.



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46. Give the diagrammatic representation of protoplast culture.



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47. Highlight the protocol for production of virus free meristem tip culture.



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48. List out the uses of in vitro growth of tissues.



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49. Who gave law of inheritance?



Watch Video Solution

50. What are the laboratory facilities needed for the plant tissue culture?



Watch Video Solution

51. What is organogenesis?



Watch Video Solution

52. Write the application of plant tissue culture.



Watch Video Solution

53. List out the steps involved in induction of callus.



Watch Video Solution

54. How virus free plants are developed?



Watch Video Solution

55. Mention two potential risks involved in Biosafety.



Watch Video Solution

56. Write a short note on biosafety.



Watch Video Solution

57. List out the ethical issues of genomic research.



Watch Video Solution

58. What is GEAC?.

Mention its role.



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59. What is bioethics ?



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60. Explain in detail about IPR.



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61. Write the advantages of artificial seeds.



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62. Name and Explain the type of tissue culture which uses plant organs on culture media.



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63. You are given a shoot tip. How will you culture it into a plant?



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64. How will you raise banana from suckers?

Give a protocol.



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65. Draw the flow chart for indirect embryogenesis.



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66. Why do we add dimethyl sulphoxide, glycerol or sucrose before cryopreservation?



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67. Define germplasm collection.



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68. By using gene manipulation research we produce varieties of organisms. What is the

need of biosafety in it?



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69. How to remove cell wall of plant cell?



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