



BIOLOGY

BOOKS - SURA BIOLOGY (TAMIL ENGLISH)

PLANT TISSUE CULTURE

Evaluation Choose The Correct Answer From The Given Option

1. 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: A::B::C



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2. 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: A::B::C



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

- A. 10 to 30 minutes and 125° C

B. 15 to 30 minutes and 121° C

C. 15 to 20 minutes and 125° C

D. 10 to 20 minutes and 121° C

Answer: A::B::C::D



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4. 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 5.0to 6.0

Answer: A::B::C::D



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5. 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: A::C::D



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6. Virus free plants are developed from

- A. Organ culture
- B. Meristem culture
- C. Protoplast culture

D. Cell suspension culture

Answer: B::C



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7. The prevention of large scale loss of biological integrity

A. Biopatent

B. Bioethics

C. Biosafety

D. Biofuel

Answer: A::B::C



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8. 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: A::B::C::D



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9. Solidifying agent used in plant tissue culture is

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

Answer: A::D

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Evaluation

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



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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. Give the examples for micro propagation performed plants.

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

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

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8. What is Cryopreservation?



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



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10. Write the protocol for artificial seed preparation.



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Additional Questions And Answers Choose The Correct Answer

1. Who proposed the concept of Totipotency?

A. Karl Ereky

B. Gottlieb Haberlandt

C. Edward Jenner

D. Ernst Hoppe

Answer: A::B::D



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2. Name the phenomenon of the reversion of mature cells to the meristematic state.

A. Redifferentiation

B. Dedifferentiation

C. Totipotency

D. Differentiation

Answer: A::B::D



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3. Artificial seeds are also called as

- A. synthetic seeds
- B. fibre seeds
- C. mature seeds
- D. Golden seeds

Answer: A::C::D



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4. Steam sterilization is done by autoclaving at

- A. $120^{\circ}C$
- B. $121^{\circ}C$
- C. $115^{\circ}C$
- D. $151^{\circ}C$

Answer: A::B::C



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5. Explant of _____ sterile segment is selected from leaf for tissue culture.

A. 1 – 3 cm

B. 1 – 2 cm

C. 1 – 1.5 cm

D. 1 – 4 cm

Answer: A::B::C



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6. The embryoids are sub-cultured to produce _____ .

A. plantlets

B. leaf

C. stem

D. root

Answer: A



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7. The plant extracts are sterilized by passing through millipore filter with

_____.

A. 0.22 mm pore diameter

B. 0.4 mm pore diameter

C. 0.2 mm pore diameter

D. 0.3 mm pore diameter

Answer: A::B::D

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8. Codeine is got from _____.

- A. Catharanthus
- B. Papaver
- C. Digitalis
- D. Cinchona

Answer: A::B

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9. Shoot meristem tip culture is used to obtain virus-free plants because

- A. shoot tip is got easily
- B. shoot tip grows faster
- C. shoot tip has the Apical bud

D. shoot meristem tip is always virus free

Answer: A::D



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10. Dimethyl sulphoxide is added during cryopreservation because it

- A. reduces the temperature.
- B. helps in enzymatic activities.
- C. protects tissues from stress of freezing.
- D. maintains tissues in dormant condition.

Answer: C



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11. _____ is a cryoprotectant.

A. glycerol

B. sodium alginate

C. macerozyme

D. MS medium

Answer: A::C



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12. Vincristine is used as

A. analgesic

B. cardiac tonic

C. anti carcinogenic substance

D. Rheumatic pain reliever

Answer: A::B::C



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Additional Questions And Answers Choose The Correct Statements

1. Plant tissue culture

- (I) Used to describe the plant part in in-vitro
- (II) Used to describe the growth of any plant part.
- (III) Plant part explant must be selected for this procedure.
- (IV) Growth can be done in culture medium

- A. III and IV only
- B. I, III and IV only
- C. I, II and IV only
- D. All of the above

Answer: A:D



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2. "Sterilization of culture room"

(I) Floor and walls are washed with detergent

(II) Used 5 % sodium chloride or 90 % ethanol for washing.

(III) The cabinet of laminar airflow is sterilized by clearing the work surface with 95 % ethanol.

(IV) Exposure of UV radiation for 15 minutes.

A. II, III and IV only

B. I and IV only

C. I, II and IV only

D. I, III and IV only

Answer: A::D



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3. "Media preparation"

(I) No single medium is capable of maintaining optimum growth of all

plant tissues.

(II) MS nutrient medium is commonly used.

(III) MS medium has carbon sources, with suitable vitamins and hormones.

(IV) Mercuric chloride is used as a solidifying agent.

A. I, III and IV only

B. I, II and III only

C. I, III and IV only

D. II, II and III only

Answer: A::B::D



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4. (I) Callus cells undergo differentiation and produces somatic embryos.

(II) Plantlets developed in vitro doesn't require hardening

(III) A complex mucilaginous polynucleotide got from seaweed is agar.

A. I and II only

B. I only

C. III and IV only

D. I and IV only

Answer: B



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5. (I) Secondary metabolites are "by products" of cell metabolism.

(II) Production of secondary metabolites can be automated using bio-reactors.

(III) Fusion product of protoplast with nucleus of different cells are cybrid.

(IV) Polyethylene glycol is used as growth agent in tissue culture.

A. I and II only

B. III only

C. III and IV only

D. I and IV only

Answer: A::D



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Additional Questions And Answers Choose The Incorrect Statements

1. (I) Plant tissue culture is used in clonal propagation
(II) The culture room can be sterilized by autoclaving
(III) MS medium is the commonly used nutrient medium.
(IV) B5 medium is also called Nitsch medium.

- A. I and IV only
B. II and IV only
C. I and III only
D. III and IV only

Answer: A::B::D



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2. (I) PEG is a secondary metabolite.

(II) Cells are agitated in a shaker in cell suspension culture.

(III) Micropropagation is applicable to pineapple and potato.

(IV) Somatic embryoids can be used for production of synthetic seed.

A. I only

B. II and III only

C. IV only

D. I and IV only

Answer: A



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3. I) Germplasm conservation refers to the conservation of non-living genetic resources like pollen, seeds etc.

(II) Coconut water affects tissue culture media.

(III) Digoxin is used for Rheumatic pain treatment

(IV) Induction of shoots in suckers of banana occurs within 168 days.

A. IV only

B. I, II and III only

C. II and III only

D. I only

Answer: A



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Additional Questions And Answers Assertion And Reason

1. Assertion (A) : Tissue culture techniques are used for commercial production of plants.

Reason (R) : Tissue culture techniques are used for plant research.

- A. Assertion is true and Reason is correct explanation of Assertion.
- B. Assertion and Reason is true but Reason is not correct explanation of Assertion.
- C. Both Assertion and Reason are true.
- D. Both Assertion and Reason are false.

Answer: A::B::D

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2. Assertion (A) : Explant is got from a plant and isolated.

Reason (R) : It is maintained in controlled condition.

- A. Assertion is true and Reason is correct explanation of Assertion.
- B. Assertion and Reason is true but Reason is not correct explanation of Assertion.
- C. Both Assertion and Reason are true.

D. Both Assertion and Reason are false.

Answer: A::B::C::D



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3. Assertion (A) : Tissue culture is practiced with plant cells.

Reason (R) : Animal cells do not show totipotency.

A. Assertion is true and Reason is correct explanation of Assertion.

B. Assertion and Reason is true but Reason is not correct explanation of Assertion.

C. Both Assertion and Reason are true.

D. Both Assertion and Reason are false.

Answer: A::C::D



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4. Assertion (A) : Different kinds of nutrient media are available for tissue culture.

Reason (R) : Generally MS medium is preferred over other media.

- A. Assertion is true and Reason is correct explanation of Assertion.
- B. Assertion and Reason is true but Reason is not correct explanation of Assertion.
- C. Both Assertion and Reason are true.
- D. Both Assertion and Reason are false.

Answer: A::C::D



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5. Assertion (A) : Banana is propagated by micropropagation.

Reason (R) : Banana does not produce seeds suitable for propagation.

- A. Assertion is true and Reason is correct explanation of Assertion.

B. Assertion and Reason is true but Reason is not correct explanation of Assertion.

C. Both Assertion and Reason are true.

D. Both Assertion and Reason are false.

Answer: A::C::D

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6. Assertion (A) : A person who invents a product must patent it.

Reason (R) : Others can start using his invention.

A. Assertion is true and Reason is correct explanation of Assertion.

B. Assertion and Reason is true but Reason is not correct explanation of Assertion.

C. Both Assertion and Reason are true.

D. Both Assertion and Reason are false.

Answer: A::C::D



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Additional Questions And Answers Choose The Correct Pair

- 1.
- (a) Cybrid – fusion of cytoplasm
 - (b) Agar – Differentiation
 - (c) Callus – Marine algae
 - (d) Rheumatic pain – Digitalis purpuria



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- 2.
- (a) Synthetic seeds – Artificial seeds
 - (b) Indole alkaloids – Antimalarial
 - (c) Catharanthus roseus – Cardiac tonic
 - (d) Quinine – Primary metabolite



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- (a) Somaclonal variations – Gametes
- (b) Artificial seeds – Primary metabolites
3. (c) secondary metabolites – Heat tolerant plants
- (d) Gametoclinal variations – Gametophytes



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Additional Questions And Answers Choose The Incorrect Pair

1. (a) Melchers – Intergenic hybrid
- (b) Chilton – Transformed tobacco plant
- (c) Murashige – Nutrient media
- (d) Maheshwari – Coconut water in tissue culture



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- (a) Totipotency – Gottlieb
Haberlandt
2. (b) Differentiation – Structural changes
of cell
- (c) Redifferentiation – Explant
- (d) Dedifferentiation – Formation of callus

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- (a) Cryopreservation – Preservation by
cooling
- (b) Protective agents – Dimethyl
sulphoxide
3. (c) Organogenesis – Cell culture
- (d) Somatic
embryogenesis – Allium sativum

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4. Choose the incorrect pair.

- (a) Roots – Rhizogenesis
- (b) Shoots – Caulogenesis
- (c) Artificial seed – Strawberry
- (d) Micropropagation – Banana



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Additional Questions And Answers Answer In One Word

1. Growing of plant tissue in artificial media _____.

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2. Who proposed the concept of totipotency / Father of Tissue culture _____.

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3. A property of plant cells enabling it to produce a entire plant from a tissue _____.

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4. Phenomenon by which callus forms a whole plant _____.



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5. Gelling agent used in tissue culture medium _____.



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6. Unorganized mass of cells obtained in in vitro culture medium _____.



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7. Process by which plantlets in tissue culture are gradually exposed to normal field condition _____.



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8. An example of a fusogen used in tissue culture _____.

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9. Fusion product of protoplast without nucleus _____.

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10. Chemical substances produced as byproducts of cell metabolism _____.

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11. An analgesic got from *Papaver somniferum* _____.

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12. An anti-carcinogenic substance got from Catharanthus species _____.

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13. Product got by encapsulation of embryoids in agarose gel _____.

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14. Somatic variations found in plants regenerated in vitro _____.

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15. Type of tissue culture used to produce virus free plants _____.

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16. Protective agents used in cryopreservation _____.

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17. Preservation of protoplasts / cells by cooling at very low temperature _____.

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18. A special right granted to the discoverer or inventor of a product by the government _____.

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Additional Questions And Answers Very Short Answer

1. What is redifferentiation?



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2. Mention the media formulation available for plant tissue culture other than MS.



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3. How is aeration done in culture medium?



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4. Why is a sterile environment important in tissue culture?



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5. What is meant by Totipotency?



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6. Who coined the term Totipotency?



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7. What is explant?



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8. What is the role of GEAC?



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9. Comment on Agar.



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10. What are embryoids?



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11. Comment on cybrid.



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12. What is meant by tissue culture?



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13. "Is there any method to produce synthetic seeds" .



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14. Draw a sketch to show role of IPR in India.



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15. Differentiate Organ culture and Meristem culture.



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16. Why is MS media used in plant tissue culture?



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17. What is Dedifferentiation?



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18. What is PEG?



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19. What is somatic hybridization?

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20. What are secondary metabolites?

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21. Give examples of two secondary metabolites produced by plants.

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22. What is somatic embryogenesis?

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

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2. What is organogenesis?

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3. Differentiate between Somaclonal variations and Gametoclinal variation.

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

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5. How are synthetic seeds/ artificial seeds produced?

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6. Explain the Biosafety guidelines are being implemented.

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7. List the applications of somatic embryogenetics.

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8. How are synthetic seeds/ artificial seeds produced?

 [Watch Video Solution](#)

9. Why is shoot meristem tip culture method used to obtain virus free plants?

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10. What is Germplasm conservation?

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11. What is Cryopreservation?

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12. What is IPR?

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13. What is patents?



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14. Mention two potential risks involved in Biosafety.



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Additional Questions And Answers Long Answer

1. Write the application of plant tissue culture.



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2. Write the advantages of artificial seeds.



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

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4. Write a note on patents.

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5. Give the detailed account of media preparation in tissue culture.

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6. Draw the flow chart of plant regeneration pathway in tissue culture.

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7. Explain in detail about IPR.



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8. Give the protocol for Micropropagation in Banana.



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9. Write a note on Bio safety.



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Unit Test Choose The Correct Answer

1. 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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2. Match the following :

| Column I | | Column II |
|----------------------|-----|---|
| 1. Totipotency | (A) | Reversion of mature cells into meristem |
| 2. Dedifferentiation | (B) | Biochemical and structural changes of cell |
| 3. Explant | (C) | Properties of living cells develops into entire |
| 4. Differentiation | (D) | Selected plant tissue transferred to culture m |

A. 1 2 3 4
C A D B

B. 1 2 3 4
A C B D

C. 1 2 3 4
B A D C

D.

Answer:

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3. 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 extracted from *Capsicum annum*.
- C. An anti malarial drug is isolated from *Cinchona officinalis*.
- D. Anticarcinogenic property is not seen in *Catharanthus roseus*.

Answer:

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4. 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

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Answer:



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5. Dimethyl sulphoxide is added during cryopreservation because it

A. reduces the temperature.

B. helps in enzymatic activities.

C. protects tissues from stress of freezing.

D. maintains tissues in dormant condition.

Answer:



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6. Name the phenomenon of the reversion of mature cells to the meristematic state.

- A. Redifferentiation
- B. Dedifferentiation
- C. Totipotency
- D. Differentiation

Answer:



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7. Explant of _____ sterile segment is selected from leaf for tissue culture.

- A. 1 – 3 cm
- B. 1 – 2 cm
- C. 1 – 1.5 cm

D. 1 – 4 cm

Answer:



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8. Choose the incorrect pair.

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- (b) Shoots – Caulogenesis
- (c) Artificial seed – Strawberry
- (d) Micropropagation – Banana



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9. Answer in a one word

Growing of plant tissue in artificial media _____



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10. A complex mucilaginous polysaccharide is obtained from _____

A. sea weeds

B. bacteria

C. bacillus

D. micrococcus

Answer:

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Unit Test Very Short Answer

1. What is hardening?

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2. What are artificial seeds?

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Unit Test Short Answer

1. What is patent ? List any two rules for patenting .

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2. Write the application of somatic embryo genesis?

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Unit Test Long Answer

1. Write a note on Applications of plant tissue culture.

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