



# BIOLOGY

## BOOKS - SURA BIOLOGY (TAMIL ENGLISH)

### PRINCIPLES AND PROCESSES OF BIOTECHNOLOGY

#### Evaluation

1. Restriction enzymes are

- A. Not always required in genetic engineering
- B. Essential tools in genetic engineering
- C. Nucleases that cleave DNA at specific sites
- D. both b and c

**Answer: D**



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2. Plasmids are

A. circular protine molecules

B. require by bacteria

C. tiny bacteria

D. confer resistance to antibiotics

**Answer: D**



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**3. EcoRI cleaves DNA at**

A. AGGGTT

B. GTATATC

C. GAATTC

D. TATAGC

**Answer: C**



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4. Genetic engineering is

A. making artificial genes

B. hybridization of DNA of one organism to  
that of the others

C. production of alcohol by using micro  
organism

D. making artificial limbs, diagnostic  
instruments such as ECG, EEG etc.

**Answer: B**

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5. The process of recombinant DNA technology has the following steps

I. Amplification of the gene .

II. Insertion of recombinant DNA in to the host cells .

III. Cutting of DNA at specific location using restriction enzyme .

IV . Isolation of genetic meterial (DNA) Pick out the correct sequence of step for recombinant DNA technology .

A. II,III,IV,I

B. IV,II,III,I

C. I,II,III,IV

D. IV,III,I,II

**Answer: D**



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6. Which one of the following palindromic base sequence in DNA can be easily cut at

about the middle by some particular restriction enzymes?

A. 5' CGTTCG 3' 3'ATCGTA 5'

B. 5' GATATG 3' 3' CTAATA 5'

C. 5' GAATTC 3' 3' CTTAAG 5'

D. 5' CACGTA 3' 3' CTCAGT 5'

**Answer: C**



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7. pBR 322, BR stands for

A. Plasmid Bacterial Recombination

B. Plasmid Bacterial Replication

C. plasmid Boliver and Rodriguez

D. plasmid Baltimore and Rodriguez

**Answer: C**



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8. Which one of the following is used as Biosensors ?

A. Electrophoresis

B. Bioreactors

C. Vectors

D. Electroportion

**Answer:**



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9. In which techniques Ethidium Bromide is used?

A. Southern Blotting techniques

B. Western Blotting techniques

C. Polymerase Chain Reaction

D. Agrose Gel Electrophoresis

**Answer: D**



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**10. Assertion:** *Agrobacterium tumifaciens* is popular in genetic engineering because this bacterium is associated with the root nodules of all cereals and pulse crops.

reason: a gene incorporated in the bacterial chromosomal genome gets automatically transferred to the cross with which bacterium is associated.

A. Both assertion and reason are true. But reason is correct explanation of assertion.

B. Both assertion and reason are true. But reason is not correct explanation of assertion

C. Assertion is true but reason is false

D. both assertion and reason are false

**Answer: D**



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**11.** Which one of the following is not correct statement.

A. Ti plasmid causes the bunched top disease.

B. Multiple cloning sites known as polylinker

C. Non viral method transfection of Nucleic acid in cell

D. Polylactic acid is a kind of biodegradable and bioactive thermoplastic

**Answer: A**



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**12.** An anylysis of chromosomal DNA using the southern hybridisation technique does not use

**A. Electrophoresis**

B. Blotting

C. Autoradiography

D. Polymerase Chain Reaction

**Answer: D**



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**13.** An antibiotic gene in a vector usually helps in the selection of

A. Component cells



B. Transformed cells

C. Recombinant cells

D. None of the above

**Answer: B**



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**14.** Some of the characteristics of Bt cotton are

A. Long fibre and resistant to aphids

B. Medium yield, long fibre and resistant to beetle pests

C. high yield and production of toxic protine crystals which kill dipteran pests

D. High yield and resitant to balll worms

**Answer: D**



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**15.** How do you use the biotechnology in modern practice ?



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**16.** What are the materials used to grow microorganism like Spirulina?



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**17.** You are working in a biotechnology lab with a bacterium namely E.coil. How will you cut the nucleotide sequence? Explain it.



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**18.** What are the enzymes you can used to cut terminal end and internal phospho di ester bond of nucleotide sequence?



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19. Name the chemicals used in gene transfer.



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20. What do you know about the word pBR332?



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21. Mention the application of biotechnology.



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**22.** What are restriction enzymes. Mention their type with role in biotechnology.



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**23.** Is there any possibility to transfer a suitable desirable gene to host plant without vector? Justify your answer.



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24. How will you identify a vector ?



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25. Compare the various types of blotting techniques.



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26. Write the advantages of herbicide tolerant crops.



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**27.** Write the advantages and disadvantages of Bt cotton.



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**28.** What is bioremediation?

Give some examples of bioremediation.



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**29.** Write the benefits and risk of Genetically Modified Foods .



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**Additional Questions And Answers I Choose The Correct Answer**

**1.** conventional biotechnology is also known as

A. Modern biotechnology

B. Traditionnal biotechnology

C. Old biotechnology

D. Kitchen biotechnology

**Answer: B**



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2. who discovered the double helix structure of DNA ?

A. Sanger and Gilbert

B. Karl Ereky

C. Watson and Crick

D. Smith and Nathans

**Answer: C**



**Watch Video Solution**

**3. who discovered restriction enzymes ?**

A. Watson and Crick

B. Avery-MacLeod-Mc Carty

C. Sanger and Gilbert

D. Arber, Smith and Nathans

**Answer: D**



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**4. Production of monoclonal antibodies by**

A. Sanger and Gilbert

B. Kohler and Milstein

C. Watson and Crick

D. Karl Ereky

**Answer: B**



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5. Who discovered penicillin \_\_\_\_\_

A. Alexander Flemming

B. Kohler

C. Milstein

D. Karl Ereky

**Answer: A**



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6. The term biotechnology was coined by

\_\_\_\_\_

A. Gottlieb

B. W . Bateson

C. Karly Ereky

D. Erich

**Answer: C**



7. \_\_\_\_\_ is a technique used to make million copies particular region of DNA

- A. PCR
- B. Biotechnology
- C. Genetic engineering
- D. Electrophoresis

**Answer: A**



8. \_\_\_\_\_ joins the sugar and phosphate molecular of double stranded DNA

A. Alkaline phosphate

B. DNA ligase

C. Endonuclease

D. Exonuclease

**Answer: B**



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9. \_\_\_\_\_ used as biofertiliser and nitrogen fixers .

A. Enzymes

B. Biomass

C. Microbial inoculants

D. Biofuels

**Answer: C**



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10. \_\_\_\_\_ developed techniques to sequence DNA .

A. Sanger and Gilbert

B. Karl Ereky

C. Waston and Crick

D. Smith and Nathans

**Answer: A**



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11. \_\_\_\_\_ is a reconstructed plasmid .

A. PBR 322 plasmid

B. Ti plasmid

C. Vectors

D. Jumping plasmid

**Answer: A**



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12. Binomial name of daffodil

A. *Erwinia aureorara*

B. *Narcissus pseudonarcissus*

C. *Oryza sativa*

D. *Alcaligenes eutrophus*

**Answer: B**



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13. \_\_\_\_\_ used to produce algal biofuel

A. *Chlamydomonas reinhardtii*

B. *Batryococcus braunii*

C. *Aequorea victoria*

D. *Alcaligenes eutrophus*

**Answer: B**



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14. Only type \_\_\_\_\_ restriction enzymes is preferred for use in recombinant DNA technology .

A. I

B. II

C. III

D. (a) and (c)

**Answer: B**



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15. DNA ligase is isolated from \_\_\_\_\_

A. E-coli

B. TMV

C.  $T_4$  phage

D. Agrobacterium

**Answer: C**



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**16.** Pick the characteristic of a vector which is not true

A. Small size

B. Suitable marker

C. Origin of replication

D. One restriction site only

**Answer: D**



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17.  $T_1$  plasmid does have this gene.

A. One

B. tra

C. ori

D. inc

**Answer: C**



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**18.** In blue white colony selection method cells with non recombinant DNA develop \_\_\_\_\_ colonies .

A. Blue

B. White

C. Blue with patches of white

D. Colourless

**Answer: A**



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19. Dicer and Drosha are \_\_\_\_\_

A. plasmid

B. rDNA

C. enzyme

D. transgenic plants

**Answer: C**



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20. Glutamine synthase is involved in \_\_\_\_\_

- A. Protein digestion
- B. Ammonia assimilation
- C. High yield
- D. Tolerant to tumour

**Answer: B**



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21. The cry toxin affects \_\_\_\_\_ system of insect pests

A. respiratory

B. digestive

C. circulatory

D. immune

**Answer: B**



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22. Flaver Savr tomato was created to \_\_\_\_\_

- A. increase vitamin content
- B. increase yield
- C. increase shelf life
- D. make tomatoes look brighter

**Answer: C**



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23. Proces that increases oxygen flow to accelerate the degradation of environmental pollutants is \_\_\_\_\_

- A. Mycoremediation
- B. Bioventing
- C. Phytoremediation
- D. Rhizofiltration

**Answer: B**



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# Additional Questions And Answers Iii Choose The Correct Statements

## 1. 'Modern Biotechnology'

(I) Ability to change the genetic material for getting new products .

(II) Ownership of the newly developed technology

.

(III) Making of wine.

(IV) making of wine.

Used for preparation of idli and dosa .

A. I and II only



B. II and III only

C. III and IV only

D. I and IV only

**Answer: A**



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## 2. 'Fermentation'

(I) It is metabolic process .

(II) Convert organic molecules into acids, gases or alcohol.

(III) Zymology is the study of fermentation.

(IV) Fermentation occur in certain types of bacteria .

A. I and II only

B. II and III only

C. I, II, III and IV

D. I and IV only

**Answer: C**



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### 3. 'Polyhydroxy butyrate'

(I) It is a group of degradable bio-polymers.

(II) It is eco-friendly bio-polymers.

(III) Has medical applications such as drug delivery and heart valves .

(IV) It is very toxic and pollute the environment .

A. I and II only

B. I, II and III only

C. I, II, III and IV

D. I and IV only

**Answer: B**



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#### 4. 'Agarose GEL electrophoresis''

(I) Agarose gel Electrophoresis used mainly for the purification of specific DNA fragments .

(II) Polyacrylamide is preferred for the purification of smaller DNA fragments .

(III) Agarose is convenient for separating RNA fragments

(IV) The gel is complex network of polymeric molecules .

A. I and II only

B. I, II and III only

C. I, II, III and IV

D. I and IV only

**Answer: B**



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# Additional Questions And Answers Iv Choose The Incorrect Statements

## 1. 'Bt Cotton'

A. Bt cotton is a genetically modified organism

B. Bt toxins are insecticidal to the larvae of moths .

C. Increase pollination by insects

D. Cost of Bt cotton seed is high

**Answer: C**



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2. 'Bt brinjal'

- A. It is a transgenic brinjal
- B. Created by inserting Cry 1 Ac.
- C. Developed to give resistance against  
Lipidopteron insects.
- D. Ineffective against sucking pests .

**Answer: D**



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**3. 'PLA''**

A. Poly lactic acid is a biodegradable .

B. It is a bioactive thermoplastic

C. It is aliphatic polyester derived from  
corn starch

D. It is synthetic polymers



**Answer: D**



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## **Additional Questions And Answers V Assertion And Reason**

1. What is gene therapy ? Illustrate using the example of adenosine deaminase (ADA) deficiency.

A. gene therapy

B. chemotherapy

C. immunotherapy

D. radiation therapy

**Answer: A**



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2. Assertion (A) : Endonuclease catalyses the cleavage of DNA at internal position .

Reason (R) : Endonuclease is an enzyme produced by bacteria .

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

B. Both Assertion and Reason are true and Reason is not correct explanation of Assertion .

C. Both Assertion and Reason are true .

D. Both Assertion and Reason are false .

**Answer: B**



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3. Assertion (A) : Single cell protein from spirulina is utilized in food industries .

Reason (R) : Single-cell proteins can cause allergy .

A. Both Assertion and Reason are true and

Reason is correct explanation of

Assertion .

B. Both Assertion and Reason are true and

Reason is not correct explanation of

Assertion .

C. Both Assertion and Reason are true .

D. Both Assertion and Reason are false .

**Answer: B**



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4. Assertion (A) : Primary metabolites produced for the maintenance of life process of microbes .

Reason (R) : Secondary metabolites are not produced by plants .

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

B. Both Assertion and Reason are true and Reason is not correct explanation of Assertion .

C. Assertion is true and Reason is false.

D. Both Assertion and Reason are false .

**Answer: C**



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5. Assertion (A) : Bt cotton is genetically modified cotton with an insecticide activity against bollworm.

Reason (R) : Yield of cotton is increased due to effective control of bollworms

A. Both Assertion and Reason are true and

Reason is correct explanation of

Assertion .

B. Both Assertion and Reason are true and Reason is not correct explanation of Assertion .

C. Both Assertion and Reason are true .

D. Both Assertion and Reason are false .

**Answer: A**



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# Additional Questions And Answers Vi Choose The Correct Pair

1. Choose the correct pair

A. Taq polymerase - *Thermus aquaticus*

B. Single cell protein - Human insulin

C. Spirulina - E-coli

D. Hydrogenase - Rhizobium

**Answer: A**



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2. Choose the correct pair

A. Biopharming - Fermentation

B. Jelly fish - GFP

C. Molecular Pharming - Increases oxygen

D. Bioventing - Decreases oxygen

**Answer: B**



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3. Choose the correct pair

A. Vitamin A- Dioxin

B. Lycopene cyclase - Phytoene synthase

C. Vitamin C - Normal rice

D. Beta-Carotene - Golden-rice

**Answer: D**



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4. Choose the correct pair

A. Ethanol - Secondary metabolite

B. Tetracycline - *Streptomyces griseus*

C. Lactic acid- Primary metabolite

D. Penicillin - *Streptomyces nodosus*

**Answer: C**



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# Additional Questions And Answers Vii Choose The Correct Pair

1. Choose the correct pair

A. Golden rice - *Oryza Sativa*

B. Polyhydroxy butyrate - Degradable  
bipolymer

C. Polylactic acid - Non-degradable

D. Green fluorescent Protein - *Aequorea*  
*Victoria*

**Answer: C**



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**2. Choose the correct pair**

- A. Transgenic plants - Noval DNA
- B. Glyphosate herbicide - Potato plant
- C. Bar gene - Strptomyces
- D. Bt cotton - Medicago Sativa

**Answer: D**



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3. Choose the correct pair

A. Dhara Mustard Hybrid - Barnase

Technology

B. FlaverSavr Tomato - DMH -11

C. Poly galacturonase - Delay ripening

D. Golden rice - Beta- Carotene

**Answer: B**



4. Choose the correct pair

A. Indirect Gene Transfer - Vector mediated  
gene transfer

B. Direct Gene Transfer - Vectorless gene  
Transfer

C. Biolistics - Tungsten particles

D. Gene Transfer - Replica plating



**Answer: D**



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## **Additional Questions And Answers Answer In One Word**

1. Origin of the word fermentation \_\_\_\_\_  
fervere .



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2. Who first demonstrated that fermentation is caused by yeast?



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3. DNA fragment containing gene of interest to be cloned \_\_\_\_\_



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4. Laboratory technique to make copies of particular region of DNA \_\_\_\_\_



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5. An example of Restriction Endonuclease

\_\_\_\_\_



**Watch Video Solution**

6. Symmetrical repeat sequence in DNA strands \_\_\_\_\_



**Watch Video Solution**

7. Source of enzyme alkaline phosphatase  
\_\_\_\_\_



**Watch Video Solution**

**8.** A DNA molecule capable of self-replication and is used as a carrier of DNA fragment

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**9.** Extra chromosomal double stranded circular DNA seen in bacteria \_\_\_\_\_



**Watch Video Solution**

10. Mobile DNA sequences \_\_\_\_\_



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11. Gene transfer brought about by application of high voltage \_\_\_\_\_



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12. Introduction of foreign nucleic acids into cells by non-viral methods \_\_\_\_\_



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13. An example of a biofortified crop \_\_\_\_\_



[Watch Video Solution](#)

14. Disease in humans that can be controlled  
by consumption of golden rice \_\_\_\_\_



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15. Example of bioactive thermoplastic \_\_\_\_\_



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16. A protein got from jellyfish \_\_\_\_\_



**Watch Video Solution**

17. Use of microbes to recover metal pollutants  
from contaminated sites \_\_\_\_\_



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**18.** Property of Turmeric which was subjected to patent \_\_\_\_\_



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## **Additional Questions And Answers Very Short Answers**

**1.** What is biotechnology ?



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2. What is fermentation ?



**Watch Video Solution**

3. What are microbial enzymes ?



**Watch Video Solution**

4. What is meant by recombinant DNA technology ?



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5. What are palindromic repeats ?

A.

B.

C.

D.

**Answer:**



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**6. Define bioventing .**



**Watch Video Solution**

**7. Define 'bio reactor'.**



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**8. Name the fungal organisms used as SCP.**



**Watch Video Solution**

**9. What is insert?**



**Watch Video Solution**

**10. Differentiate Primary metabolites and Secondary metabolites .**



**Watch Video Solution**

**11. Comment of PCR .**



**Watch Video Solution**

**12.** Name the basic tools which are required for rDNA technology .



**Watch Video Solution**

**13.** Differentiate Exonuclease & Endonucleases .



**Watch Video Solution**

**14.** What is the role of alkaline phosphatase in genetic engineering ?



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**15.** Define plasmid .



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**16.** What are the walking genes (or ) jumping genes ?



[Watch Video Solution](#)

**17.** What are cosmids ?



**Watch Video Solution**

**18.** Write a brief note on Biolistics.



**Watch Video Solution**

**19.** What is LacZ?



**Watch Video Solution**



**20.** What do you mean by DNA probes ?



**Watch Video Solution**

**21.** Mention the types of blotting techniques .



**Watch Video Solution**

**22.** Define Transfection.



**Watch Video Solution**

**23.** What is meant by genome sequencing ?



**Watch Video Solution**

**24.** What is meant by Transgenic plants ?



**Watch Video Solution**

**25.** Differentiate Phytoremediation and Mycoremediation .



**Watch Video Solution**

**26. What is algal biofuel ?**



**Watch Video Solution**

**27. Differentiate Bioleaching and Bioaugmentation .**



**Watch Video Solution**

**28.** Differentiate Rhizofiltration and Rhizostimulation .



**Watch Video Solution**

**29.** Differentiate Symmetric and Asymmetric cuts of restriction enzymes .



**Watch Video Solution**

**30.** Write a note biochemical activity of DNA ligase .



**Watch Video Solution**

**31.** Name the two types of gene transfer methods in plants .



**Watch Video Solution**

**32.** Define Electrophoresis



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**33.** Comment of ELISA .



[Watch Video Solution](#)

**34.** What is meant by Biotting ?



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**35.** Comment on plant genome project .



[Watch Video Solution](#)

**36.** Mention some of the names of biodegradable liopolymers .



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**37.** What is antibiotic resistant markers ?



[Watch Video Solution](#)

**38.** Comment on Lambda genome.



**Watch Video Solution**

**39.** What is the use of GFP ?



**Watch Video Solution**

**40.** What is the advantage of Bt Brinjal ?



**Watch Video Solution**



**41.** What is RNA interference ?



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**42.** Why are eukaryotic cells preferred for expression of eukaryotic proteins in Biotechnology ?



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**43.** What is the advantage of multiple cloning sites in vectors ?



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**Additional Questions And Answers Short Answers**

**1.** What are vectors ?



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2. What are the types of vectors ?



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3. Write a short note on conventional biotechnology.



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4. Define biopiracy ? Give its examples .



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5. Define Biopharming . Give its uses .



**Watch Video Solution**

6. Write a note on bioprospecting .



**Watch Video Solution**

7. How can biotechnology used in plants of virus resistance ?



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**8.** Enumerate the applications of single-cell protein .



**Watch Video Solution**

**9.** Explain about the Ti plasmid .



**Watch Video Solution**

**10.** How will you transfer the genes into the plant cell with the help of electricity ?



**Watch Video Solution**

**11.** Write notes on FlavrSvr tomato .



**Watch Video Solution**

**12.** Given an account of limitations of Bioremediation .



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**13.** write the protocol for glyphosate tolerant potato plant .



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**14.** Differentiate Insertion vector and the Replacement vector .



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15. What is CRISPR - Cas 9 ?



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16. Differentiate Expression vectors and Shuttle vectors .



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17. Explain the method of hydrogen production by algae .







[Watch Video Solution](#)

**18.** Why is *Escherichia coli* widely used in cloning experiments ?



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## Additional Questions And Answers Long Answers

**1.** Write about the process of fermentation



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2. What are single cell proteins? List out its uses ?



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3. What are the step involved in recombinant DNA rechnology ?



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4. What is the purpose of green fluorescent protein ?



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5. What is genetically modified mustard ?



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6. Name the type of gene which is inserted into golden rice ? List out the benefits .



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7. Explain Southern blotting techniques .



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8. Explain agarose GEL electrophoresis .



[Watch Video Solution](#)

9. Given an account of BASTA.



[Watch Video Solution](#)

**10.** Define Biopiracy . Explain with Neem as an example ?



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**11.** Explain about the biodegradable plastics



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12. Explain the replica plating technique .



[Watch Video Solution](#)

13. Explain the liposome mediated method of gene transfer?



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**Unit Test I Choose The Correct Answer**

1. The process of recombinant DNA technology

has the following steps

I. Amplification of the gene .

II. Insertion of recombinant DNA in to the host cells .

III. Cutting of DNA at specific location using restriction enzyme .

IV . Isolation of genetic meterial (DNA) Pick out the correct sequence of step for recombinant DNA technology .

A. II,III,IV,I

B. IV,II,III,I

C. I,II,III,IV

D. IV,III,I,II

**Answer:**



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2. Symmetrical repeat sequence in DNA strands \_\_\_\_\_



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3. Only type \_\_\_\_\_ restriction enzymes is preferred for use in recombinant DNA technology .

A. I

B. II

C. III

D. (a) and (c)

**Answer:**



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4. Assertion: *Agrobacterium tumifaciens* is popular in genetic engineering because this bacterium is associated with the root nodules of all cereals and pulse crops.

Reason: a gene incorporated in the bacterial chromosomal genome gets automatically transferred to the cross with which bacterium is associated.

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

B. Both Assertion and Reason are true and Reason is not correct explanation of Assertion .

C. Assertion is true , but reason is false

D. Assertion is false , but reason is true

**Answer:**



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**5. 'Bt Cotton'**

A. Bt cotton is a genetically modified organism

B. Bt toxins are insecticidal to the larvae of moths .

C. Increases pollination by insects .

D. Cost of Bt cotton seed is high

**Answer:**



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6. Choose the correct pair

A. Taq polymerase - *Thermus aquaticus*

B. Single cell protein - Human insulin

C. Spirulina - E-coli

D. Hydrogenase - Rhizo filtration

**Answer: A**



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7. who discovered penicillin ?

A. Alexander Flemming

B. Kohler

C. Milstein

D. Karl Ereky

**Answer:**



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8. \_\_\_\_\_ is a reconstructed plasmid .

A. PBR 322 plasmid

B. Ti plasmid

C. Vectors

D. Jumping plasmid

**Answer:**



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9. Choose the incorrect pair

A. Indirect Gene Transfer - Vector mediated  
gene transfer

B. Direct Gene Transfer - Vectorless gene  
Transfer

C. Biolistics - Tungsten particles

D. Gene Transfer - Replica plating

**Answer:**



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**10. Restriction enzymes are**

A. Not always required in genetic engineering

B. Essential tools in genetic engineering

C. Nucleases that cleave DNA at specific sites

D. both b and c

**Answer:**





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## Unit Test Ii Very Short Answer

1. What is Bioremediation ?



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2. What is Tiplasmid ?



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3. Write the advantages of herbicide tolerant crops.



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4. How will you transfer the genes into the plant cell with the help of electricity ?



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5. Is there any possibility to transfer a suitable desirable gene to host plant without vector?

Justify your answer.



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