



BIOLOGY

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PRINCIPLES AND PROCESSES OF BIOTECHNOLOGY

Textbook Questions Answers

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 protein molecules

B. required 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 other

C. production of alcohol by using micro organisms.

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

Answer: (b)



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5. Consider the following statements :

i. Recombinant DNA technology is popularly known as genetic engineering is a stream of biotechnology which

deals with the manipulation of genetic materials by man
invitro

ii. pBR322 is the first artificial cloning vector developed in 1977 by Boliver and Rodriguez from E.coli plasmid.

iii. Restriction enzymes belong to a class of enzymes called nucleases . Choose that correct option regarding above statements

A. I & II

B. I & III

C. II & III

D. I,II & III

Answer: (d)



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6. 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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7. 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' CGTTCG3' 3'ATCGTA5'

B. 5'GATATG3' 3'CTACTA5'

C. 5'GAATTC3' 3'CTTAAG5'

D. 5'CACGTA3' 3'CTCAGT5'

Answer: (a)



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

A. Electrophoresis

B. Bioreactors

C. Vectors

D. Electroporation

Answer: (c)



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10. Match the following

Column-I

1. Exonuclease
2. Endonuclease
3. Alkaline Phosphatase
4. Ligase

Column-II

- A add or remove phosphate
- B. Binding the DNA fragments
- C. Cut the DNA at terminus
- D. cut the DNA at middle



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11. In which techniques Ethidium Bromide is used?

- A. Southern Blotting techniques
- B. Western Blotting techniques
- C. Polymerase Chain Reaction
- D. Agrose Gel Electroporosis

Answer: (d)



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12. 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. Assertion is false, but Reason is true.

Answer: (b)



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13. Which one of the following is not correct statement.

A. Ti plasmid causes the bunchy top disease

B. Multiple cloning site is 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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14. An analysis 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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15. An antibiotic gene in a vector usually helps in the selection of

- A. Competent cells
- B. Transformed cells
- C. Recombinant cells
- D. None of the above

Answer: (b)



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16. 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 protein crystals which kill dipteran pests.

D. High yield and resistant to ball worms.

Answer: (d)



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17. How do you use the biotechnology in modern practice ?

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

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

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21. Name the chemicals used in gene transfer.

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22. What do you know about the word pBR332?

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23. Mention the application of biotechnology.



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24. What are restrictions enzyme. Mention their type with role in biotechnology.



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25. How will you identify a vector ?

A. A vector can easily be identified by the following characteristics:

(i) Vector is a small DNA molecule capable of self-replication.

(ii) It should be small in size with low molecular weight, less than 10kb in size.

(iii) A vector should contain an origin of replication, so that they can self-replicate independently.

(iv) A vector should have a marker gene such as antibiotic resistance to detect it is transformed host cell.

(v) A vector should have unique target sites for integration with DNA insert and have the ability to

integrate with DNA insert, which is carried into the genome of host cell.

B.

C.

D.

Answer:



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26. Compare the various types of blotting techniques.

A. Blotting techniques refers to the process of immobilization of sample nucleic acid or solid

support (nitrocellulose or nylon membrane). The blotted nucleic acids are then used as target in the hybridization experiments for their specific detection. There are three types of blotting techniques namely southern blotting, northern blotting and western blotting.

Southern blotting : This technique was introduced by southern in 1975. In this, the transfer of denatured DNA from agrose gel to nitrocellulose blotting or filter paper.

The steps involved in this technique are as follows:

(i) The transfer of DNA from agrose gel to

nitrocellulose filter paper is carried out by capillary action.

(ii) DNA is highly soluble in a buffer sodium saline citrate (SSC) used in this and the nitrocellulose filter paper can absorb the DNA from the buffer.

(iii) The DNA becomes trapped in the membrane matrix by this process.

(iv) This DNA is hybridized with nucleic acid and can be detected by autoradiography.

Northern Blot : Alwin et al in 1979 found out this technique in which RNA bands are transferred from agarose gel into nitrocellulose filter paper. This

transfer of RNA from gel to special filter paper called Amino Benzyloxy methyl paper which can be prepared from whatman 540 paper.

Western Blot: It is modified technique in which electrophoretic transfer of proteins to blotting paper occurs and nitrocellulose blotting papers can be used in this technique. The protein is then identified by radio labelled antibody which binds on the specific protein in which the antibody was prepared.

B.

C.

D.

Answer:



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27. Write the advantages of herbicide tolerant crops.

A. The advantages of herbicide tolerant plants are:

- (i) The crop yield can be increased by weed control.
- (ii) Spray of chemical pesticides can be reduced.
- (iii) The compounds, which do not remain active in the soil with low toxicity can be applied.

(iv) This provides ability to conserve soil structure and microbes.

B.

C.

D.

Answer:



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28. Write the advantages and disadvantages of Bt cotton.

A. The advantages of Bt cotton include :

(i) Due to effective resistance of bollworm, the yield

of cotton is increased.

(ii) Reduced use of insecticide in the cultivation of Bt cotton.

(iii) There is considerable reduction in the cost of cultivation.

The disadvantages of Bt cotton include :

(i) Cost of Bt cotton seed is high.

(ii) Upto 120 days, they are effective, after that efficiency is reduced.

(iii) Bt cotton is not effective against sucking pests like jassids, aphids and whitefly.

(iv) It affects pollinating insects and thus yield.

B.

C.

D.

Answer:



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29. What is bioremediation?

Give some examples of bioremediation.



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30. Write the benefits and risk of Genetically Modified Foods .



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Other Important Questions Answers Choose The Correct Answer

1. Match the following

(p) Bread

(i) Phytoremediation

(q) Wine

(ii) Spirulina

(r) single cell protein

(iii) Fermentation

(s) plant

(iv) Classical biotechnology

A. (p) -(iv) , (q)-(iii), (r)-(ii), (s)-(i)

B. (p)-(iii), (q)-(iv), (r)-(ii), (s)-(i)

C. (p)-(ii),(q)-(i), (r)-(iv), (s)-(iii)

D. (p)-(iv), (q)-(iii),(r)-(ii),(s)-(i)

Answer:



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2. Match the following:

(p) Biofuel

(i) Nitrogen fixers

(q) Biomass

(ii) Hydrogen

(r) Process engineering

(iii) Bulk production

(s) Biofertilizer

(iv) Water recycling

A. (p) -(iv) , (q)-(iii), (r)-(ii), (s)-(i)

B. (p)-(ii), (q)-(i), (r)-(iv), (s)-(iii)

C. (p)-(ii),(q)-(iii), (r)-(iv), (s)-(i)

D. (p)-(iii), (q)-(iv), (r)-(ii), (s)-(i)

Answer:



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3. Match the following: (Products of Biotechnology)

(p) Tetracyclin	(i) Primary Metabolite
(q) Alkaloid	(ii) Microbial enzyme
(r) Lactic acid	(iii) secondary Metabolite
(s) Protease	(iv) Streptomycin aureofacins

A. (p) -(iv) , (q)-(iii), (r)-(ii), (s)-(i)

B. (p)-(iii), (q)-(iv), (r)-(i), (s)-(ii)

C. (p)-(iv), (q)-(iii), (r)-(i), (s)-(ii)

D. (p)-(ii), (q)-(i), (r)-(iv), (s)-(iii)

Answer:



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4. Match the following:

- | | |
|----------------------|-------------------------|
| (p) Alwin et al | (i) Proteins |
| (q) Southern | (ii) Northern blotting |
| (r) Plasmid | (iii) Southern blotting |
| (s) Western blotting | (iv) Vector |

A. (p) -(iv) , (q)-(iii), (r)-(ii), (s)-(i)

B. (p)-(iv), (q)-(iii),(r)-(i),(s)-(ii)

C. (p)-(ii),(q)-(i), (r)-(iv), (s)-(iii)

D. (p)-(ii),(q)-(iii), (r)-(iv), (s)-(i)

Answer:

5. Match the following:

- (p) Bt cotton (i) Barnase/barstar technology
(q) Basta (ii) Transgenic
(r) Bt brinjal (iii) Pest resistant
(s) DMH (iv) Phosphinothricin

A. (p)-(iii), (q)-(iv), (r)-(i), (s)-(ii)

B. (p)-(iii), (q)-(iv), (r)-(ii), (s)-(i)

C. (p)-(iv), (q)-(iii), (r)-(ii), (s)-(i)

D. (p)-(ii), (q)-(i), (r)-(iv), (s)-(iii)

Answer:

6. Curd forming is a process of:

- A. Biodegradation
- B. Fermentation
- C. Sterilization
- D. Bioremediation

Answer: (b)

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7. The technique of gene transfer using a pulse high voltage is known as :

A. Liposome mediated transfer

B. Electromagnetic transfer

C. Electrophoration

D. Biolistic

Answer: (c)



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8. The chemical used in southern blotting is:

A. B galactoside

B. Nitrophenol

C. Nitrocellulose

D. Benzyloxymethyl

Answer: (c)



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9. Bt brinjal is created by inserting a crystal protein gene called.

- A. *Bacillus typhae*
- B. *Streptomyces hygroscopicus*
- C. *Streptomyces griseus*
- D. *Bacillus thuringiensis*

Answer: (d)



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10. Addition of selected microbes to speed up degradation process called:

- A. Bioleaching
- B. Bioaugmentation
- C. Biofiltration
- D. Bioventing

Answer: (b)



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11. Choose the odd man out

A. Ethanol

B. Acetic Acid

C. Vitamins

D. Citric acid

Answer: (c)



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12. Indicate the odd one out :

A. Fermentation

B. r-DNA technology

C. Bioconversion

D. SCP production

Answer: (b)



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13. Find out the odd one:

A. *Methylophilus methylotropus*

B. *Cellulomonas*

C. *Alcaligenes*

D. *Candida utilis*

Answer: (d)



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14. Choose the odd one:

A. Hind III

B. ColEI

C. EcoRI

D. BamHI

Answer: (b)



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15. Indicate the odd one:

A. Micro injection

B. Electroporation

C. Biolistic

D. Western blot

Answer: (d)



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16. Choose the correct pair

A. *Streptomyces griseus* -Tetracycline

B. Streptomyces nodosus -Amphotericin-B

C. Streptomyces aureofacins -Penicillin

D. Penicillin chrysogenum - Streptomycin

Answer: (b)



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17. Find out the incorrect pair.

A. Genetic Engineering - r-DNA technology

B. Restriction Enzyme - Endonuclease

C. DNA ligase - Cleavage enzyme

D. Vector - Plasmid

Answer: (c)



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18. Indicate the correct pair :

A. Ti plasmid - *Agrobacterium tumefaciens*

B. Walking gene - Expression vector

C. Gene transfer - Nitrocellulose

D. Liposome - artificial glycolipid vesicle

Answer: (a)



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19. Choose the incorrect pair:

- A. Bt cotton - GM food
- B. Basta- Herbicide tolerant
- C. Bt Brinjal - Delhi university
- D. DHM - II -Transgenic mustard

Answer: (c)



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20. Indicate the correct pair :

- A. Phytoremediation - use of algae

B. Mycoremediation - use of Fungi

C. Bioventing - use of plants

D. Bioleaching - use of earthworm

Answer: (b)

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21. Assertion: Traditional biotechnology is the kitchen technology by using the fermenting bacteria.

Reason: There is no scientific validation of these kitchen technologies.

(a) Both Assertion and Reason are true. But Reason is the 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.



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22. Assertion : Secondary metabolites are those which are required for the vital life process of microbes.

Reason: They are the vital compounds required for the growth of microbes.

(a) Both Assertion and Reason are true. But Reason is the 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.



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23. Assertion: The single cell protein forms an important source of food.

Reason : Because they contain protein,carbohydrate, fats,vitamins and minerals.

(a) Both Assertion and Reason are true. But Reason is the 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.



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24. Assertion: The restriction enzymes are called as molecular scissors.

Reason : They cleave the DNA molecules into fragment at specific recognition sites.

(a) Both Assertion and Reason are true. But Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true. But Reason is not correct explanation of Assertion.

(c) Assertion is true.

(d) Both Assertion and Reason are false.



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25. Assertion : Polylactic acid (PLA) is a biodegradable and bioactive thermoplastic.

Reason: It is aliphatic polyester derived from renewable resources.

(a) Both Assertion and Reason are true. But Reason is the 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.



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26. Which of the following statement is correct?

- (a) Liposomes are the artificial lipoprotein vesicles used for gene transfer.
- (b) Liposomes are the artificial glycoprotein vesicles used for gene transfer.
- (c) Liposomes are artificial phospholipid vesicles used for gene transfer.
- (d) None of the above.



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27. Choose the incorrect statement.

- (a) The bacterium *Streptomyces nodosus* produces the antibiotic Amphotericin - B.

(b) Ethanol is the primary metabolite produced by microorganism.

(c) Vitamins are the secondary metabolites.

(d) All the above statements are not correct.



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28. Indicate the correct statement:

(a) Humulin is the first pharmaceutical product of rDNA technology for human use.

(b) The first transgenic animal, Dolly was developed by rDNA technology.

(c) First crop plant genome was sequenced in wheat.

(d) Sir Robert G. Edwards grew stem cells in laboratory.



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29. Which of the following statement is wrong :

- (a) Enzymes are biosensors in processing industry.
- (b) Bio mass is the bulk production of single cell organisms.
- (c) Process engineering is the tool of biotechnology used for effluent treatment.
- (d) All the above statement is the wrong.



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30. Choose the correct statement :

- (a) Composting is the process of recycling solid waste by microbes.

(b) Composting is the process of recycling solid waste by plants.

(c) Bioleaching is the use of plants to recover metal pollutants.

(d) Rhizofiltration is the process of water purification.



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Other Important Questions Answers Answer The Following

1. Name the scientists who first produced monoclonal antibodies.



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2. Define traditional Biotechnology.



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3. Name any two commercial products produced through fermentation technology.



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4. Mention any two single cell protein.



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5. Define conventional recombination.

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6. What is meant by polymerase chain reaction(PCR) ?

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7. Name the basic tools used for genetic engineering.

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8. Define Vectors?

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9. Define Biopiracy ?



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10. What is a plasmid?



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11. What is chemical mediated gene transfer?



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12. What is an antibiotic gene marker ?



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13. What is meant by ELISA?



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14. Define Transfection.



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15. What is meant by Transgenic plants ?



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16. Name any two genetically modified food.



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17. Define Biopharming . Give its uses .



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18. What is Mycoremediation?



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19. What is Composting?



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20. What is bioreactor?

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21. Mention any three bioconversion done by fermenting microbes.

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22. Explain the types of restriction enzymes.

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23. Give a schematic diagram of Alkaline Phosphate action.

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24. What is meant by walking gene? Explain it briefly.

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25. Describe biolistics.

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26. Explain the techniques of Northern Blot.

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27. Write the advantages of herbicide tolerant crops.

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28. List the advantage of Bt cotton.

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29. List the examples of Bioremediation technologies.



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30. Differentiate Rhizofiltration and Rhizostimulation .

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31. what is the importance of fermentation technology?

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

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33. Explain the role of *Agrobacterium* as a vector in gene transfer.



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34. Explain the technique of biological hydrogen production by algae with the aid of suitable diagram.



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35. Bring out the differences between blotting techniques.



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36. Draw the schematic diagram of steps involved in southern blotting technique.



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