BIOLOGY

BOOKS - ARIHANT PUBLICATION

PRINCIPLES AND PROCESSES OF BIOTECHNOLOGY

Part I Questions For Practice Very Short Answer Type Questions

1. GAATTC is the recognition site for which of the following restriction endonucleases?

A. Hind III

B. Eco RI

C. Bam I

D. Hae III

Answer: B

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2. Given below is a sample of a portion of DNA strand giving the base sequence on the opposite stands. What is so special shown in it ?

5'–––––––GAATTC––––––5'

3'–––––––CTTAAG––––––5'

A. Replication completed

B. Deletion mutation

C. Start codon at the 5' end

D. Palindromic sequence

Answer: D

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3. Agarose extracted from sea weeds is used in

A. spectrophotometer

B. tissue culture

C. PCR

D. gel electrophoresis

Answer: D

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4. The blotting of RNA is called

A. Northern blot

B. Southern blot

C. Western blot

D. Eastern blot

Answer: A

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Part I Questions For Practice Very Short Answer Type Questions Correct The Statements If Required By Changing The Underlined Word S

1. Restriction enzymes are used to cut single-stranded DNA.

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2. Eco RI is a coenzyme.

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Part I Questions For Practice Very Short Answer Type Questions Fill In The Blanks

1. DNA polymerase can be obtained from .....

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2. The usual source of restriction endonuclease used in gene cloning is .....

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3. Other than E.coli..... bacteria is used in recombinant DNA technology.

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Part I Questions For Practice Very Short Answer Type Questions Express In One Or Two Word S

1. Molecular scissors used in recombinant technology are known as

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2. Which enzyme helps in joining DNA fragments?

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Part I Questions For Practice Short Answer Type Questions

1. Write Short notes on Genetic engineering

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2. What are restriction enzymes ? Mention their functions in recombinant DNA technology.

3. Mention the difference in the mode of action of exonuclease and endonuclease.

4. What is the function of Restriction endonuclease?

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5. How are 'sticky ends' formed on a DNA strand? Why are they so called?

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6. A recombinant DNA is formed when sticky ends of the vector DNA and the foreign DNA join. Explain, how sticky ends are formed and get joined?

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7. What does 'H', 'd' and 'III' refer to in the enzyme Hind III?

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8. Collect five examples of palindromic DNA sequences by consulting your teacher. Better try to create a palindromic sequence by following base-pair rules.

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9. Restriction enzymes should not have more than one site of action in the cloning site of a vector. Comment.

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10. Draw agarose gel electrophoresis apparatus. Description is not required.

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11. A mixture of fragmented DNA was electrophoresed in an agarose gel. After staining the gel with ethidium bromide, no DNA bands were observed. What could be the reason?

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12. Name the technique used for the separation of DNA fragments.

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13. Name the technique used for the separation of DNA fragments.

Watch Video Solution

14. Write the type of matrix used in gel electrophoresis.

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15. Write Short notes on Recombinant DNA technology

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16. A plasmid DNA and a linear DNA (both of the same size) have one site for a restriction endonuclease, When cut and separated on agarose gel electrophoresis, plasmid shows one DNA band while, linear DNA shows two fragments. Explain.

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Part I Questions For Assessment Very Short Answer Type Questions

1. Eco RI cleaves the DNA strands to produce

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2. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by :

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Part I Questions For Assessment Very Short Answer Type Questions Correct The Statements

If Required By Changing The Underlined Word

1. What is the first restriction endonuclease ?

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2. DNA ligase forms phosphodiester bonds to ligate the DNA fragments.

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Part I Questions For Assessment Very Short Answer Type Questions Fill In The Blanks

1. First letter of restriction enzymes represents..... .

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2. Alkaline phosphatase is an ..... enzyme.

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Part I Questions For Assessment Very Short Answer Type Questions Express In One Or Two Word S

1. Name the process of transfer of protein molecules onto a membrane.

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2. Single-stranded fragments are transferred onto nitrocellulose filter paper by which process?

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Part I Questions For Assessment Short Answer Type Questions

1. Explain diagrammatically the action of restriction enzyme on DNA.

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2. What are restriction enzymes ? Mention their functions in recombinant DNA

technology.

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3. Explain electrophoresis.

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4. Briefly explain electroblotting.

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Part Ii Questions For Practice Very Short Answer Type Questions Choose The Correct Option

1. Commonly used vectors for human genome sequencing are :

A. T-DNA

B. BAC and YAC

C. expression vector

D. T/A cloning vectors

Answer: B

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2. Which procedure is followed for amplification of DNA?

A. Electrophoresis

B. Autoradiography

C. Polymerase chain reaction

D. Southern blotting

Answer: C

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3. Polymerase chain reaction is most useful in :

A. in vivo replication of specific DNA sequence using thermostable DNA polymerase

B. in vitro synthesis of mRNA

C. in vitro replication of specific DNA sequence using thermostable DNA polymerase

D. in-vivo synthesis of mRNA

Answer: C

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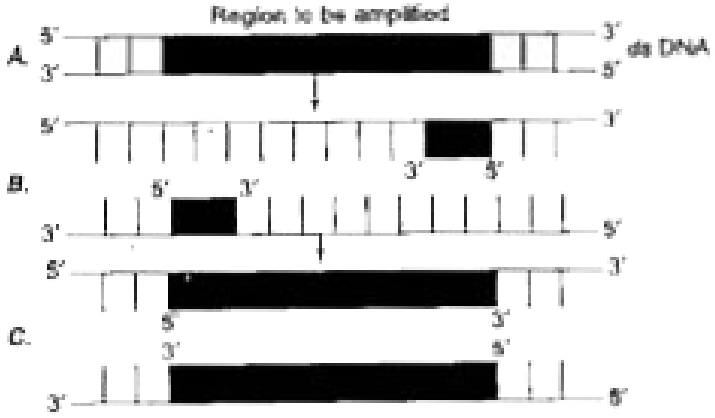
4. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together

with what it represents?



A. B - denaturation at a temperature of about 98° C separating the two DNA strands

B. A - denaturation at a temperature of about 50° C

C. C-extension in the presence of heat stable DNA polymerase

D. A-annealing with two sets of primers

Answer: A

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5. Plasmids present in bacterial cells are linear double helical DNA molecules.

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6. taq polymerase is used between annealing and denaturation during PCR.

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Part Ii Questions For Practice Very Short Answer Type Questions Fill In The Blanks

1. The vector for t-DNA is.....

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2. In biolistic method ..... particles coated with foreign DNA are bombarded into target cells.

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3. Name the bacterium that yields thermostable DNA polymerases.

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4. What is particle gun?

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Part Ii Questions For Practice Short Answer Type Questions

1. Write the role of 'ori' and 'restriction site' in a cloning vector PBR322.

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2. Write a short note on plasmids.

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3. You have chosen a plasmid as vector for cloning your gene. However, this vector plasmid lacks a selectable marker. How would it affect your experiment?

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4. Draw a schematic sketch of PBR322 plasmid and label the following in it.

Any two restriction sites

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5. Draw a schematic sketch of PBR322 plasmid and label the following in it.

Ori and rop genes

Watch Video Solution

6. Draw a schematic sketch of PBR322 plasmid and label the following in it.

An antibiotic resistant gene

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7. How are recombinant vectors created?

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8. For creating one recombinant vector only one type of restriction endonuclease is required.Give reason.

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9. How bacterial cells are made competent to take up DNA?

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10. Describe the role of CaCl, in the prepration of competent cell.

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11. PCR is a useful tool for early diagnosis of an infectious disease. Comment.

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12. Explain, how to find whether an Ecoli bacterium has transformed or not, when a recombinant DNA bearing ampicillin-resistance gene is transferred into it.

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13. What does the ampicillin-resistant gene act as ?

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14. Name the source of the DNA polymerase used in PCR technique. Mention, why it is used ?

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15. Give the name of the organism from where the thermostable DNA polymerase is isolated. State its role in genetic engineering.

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16. Rearrange the following in the correct sequence to accomplish an important biotechnological reaction

(a) in vitro synthesis of copies of DNA of interest

(b) Chemically synthesised oligonucleotides

(c) Enzyme DNA polymerase

(d) Complementary region of DNA

(e) Genomic DNA template

(f) Nucleotides provided

(g) Primers

(h) Thermostable DNA-polymers (From Thermus aquaticus)

(i) Denaturation of dsDNA

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17. While doing a PCR, denaturation step is missed. What will be its effect on the process?

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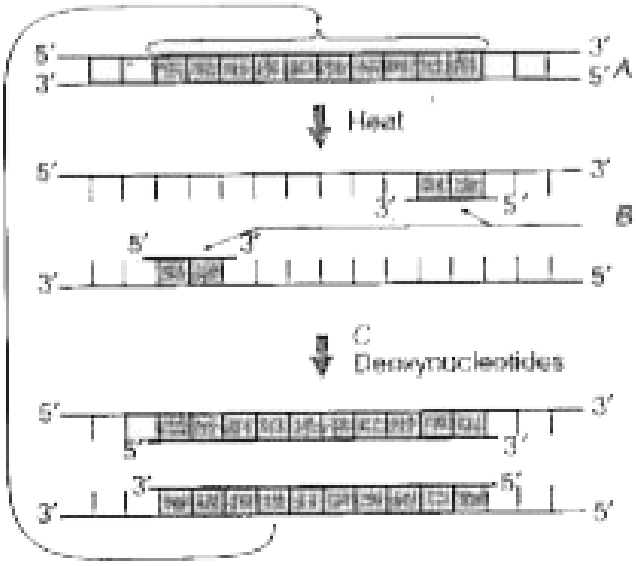
18. A schematic representation of PCR up to the extension stage is given below. Give answers of the following questions.



Name the process A.

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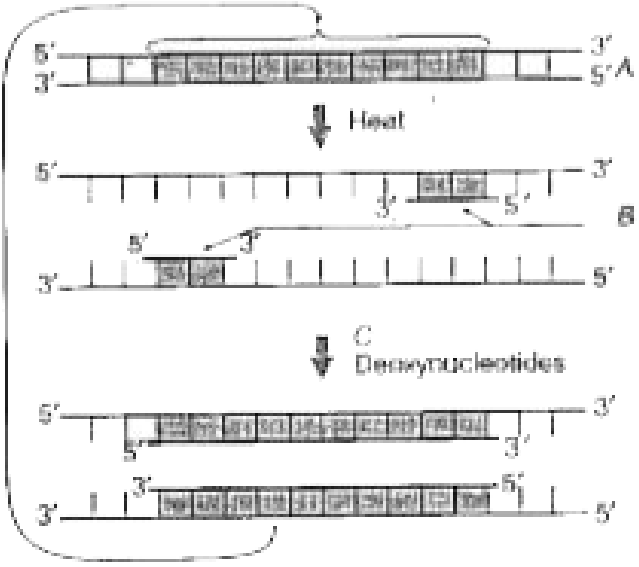
19. A schematic representation of PCR up to the extension stage is given below. Give answers of the following questions.



Identify B.

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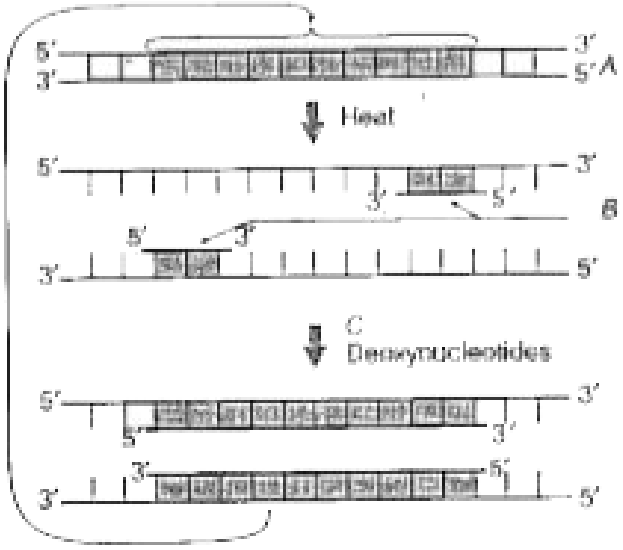
20. A schematic representation of PCR up to the extension stage is given below. Give answers of the following questions.



Identify C and mention its importance in PCR.

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Part Ii Questions For Assessment Very Short Answer Type Questions Choose The Correct Option

1. In recombinant DNA technique, the term vector refers to

A. plasmids that can transfer foreign DNA into a living cell

B. cosmids that can cut DNA at specific base sequence

C. plasmids that can join different DNA fragments

D. cosmids that can degrade harmful proteins

Answer: A

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2. The rDNA molecule is introduced into the cell of bacterium with the help of

A. restriction endonuclease

B. DNA ligase

C. electroporation

D. None of the above

Answer: A

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3. The bacterial source of Hpa I is

A. Haemophilus influenzae

B. Bacillus amyloliquefaciens

C. Providentia stuarti

D. Haemophilus parainflurezae

Answer: D

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4. Klenow fragment does not possess

A. 5' $\rightarrow$ 3' exonuclease

B. 3' $\rightarrow$ 5'exonuclease

C. polymerase

D. All of these

Answer: A

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Part Ii Questions For Assessment Very Short Answer Type Questions Correct The Statements If Required By Changing The Underlined Word S

1. A hybrid of plasmid and phage is $\underline{\mathrm{YAC}}$.

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2. Bacteria phage are autonomously replicating circular DNA.

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Part Ii Questions For Assessment Very Short Answer Type Questions Fill In The Blanks

1. ..... is most commonly used process of foreign DNA injection in animal cells.

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2. ..... helps in selecting transformants and eliminating non-transformants.

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Part Ii Questions For Assessment Very Short Answer Type Questions Express In One Or Two Word S

1. Name one chemical that helps foreign DNA to enter host cell.

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Part Ii Questions For Assessment Short Answer Type Questions

1. Agrobacterium is considered a good cloning vector. Why?

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2. Explain the contribution of Thermus aquaticus in the amplification of a gene of interest.

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3. Klenow fragment and Taq polymerase.

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4. Differentiate between Transformation and screening.

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Part Ii Questions For Assessment Differentiate Between The Following

1. Differentiate between: Exonuclease and Endonuclease.

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2. Differentiate between the Plasmid and Chromosomal DNA.

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3. Differentiate between the Electroporation and Microinjection.

Watch Video Solution

4. Differentiate between the Type-I endonuclease and Type II endonuclease.

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Odisha Bureau S Textbook Solutions Very Short Answer Type Questions Multiple Choice Questions

1. The double helical structure of DNA was proposed by

A. Jacob and Monod

B. Sanger and Gilbert

C. Watson and Crick

D. Beadle and Tatum

Answer: C

2. Polymerase chain reaction was discovered by

A. H G Khorana

B. K Mullis

C. R Holley

D. M Nirenberg

Answer: B

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3. Exonuclease is an enzyme that

A. makes internal cuts in polynucleotide

B. polymerises nucleotides

C. joins two polynucleotide fragments

D. removes nucleotides from the termini one after another

Answer: D

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4. DNA ligase is commonly known as

A. molecular scissors

B. molecular marker

C. molecular glue

D. molecular probe

Answer: C

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5. During electrophoresis, DNA fragments move from

A. anode to cathode

B. remain static

C. move randomly

D. cathode to anode

Answer: D

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6. The blotting of protein molecules to a nylon membrane is known as

A. Southern blotting

B. Western blotting

C. Northern blotting

D. Eastern blotting

Answer: B

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7. Detection of a desired DNA fragment by using radioactive emission is known as

A. hybridisation

B. denaturation

C. autoradiography

D. electrophoresis

Answer: C

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8. Choose the incorrect statement.

A. A plasmid is small, double-stranded circular DNA

B. A plasmid contains an origin of replication

C. A plasmid has several restriction sites

D. A plasmid has telomeres

Answer: D

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9. A cosmid is a

A. plasmid phage hybrid vector

B. DNA bacteriophage vector

C. expression vector

D. viral vector

Answer: A

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10. The example of a plant cell compatible vector is

A. fertility plasmid

B. colicinogenic plasmid

C. tumour inducing plasmid

D. resistance plasmid

Answer: C

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11. Amplification of DNA by PCR uses a DNA polymerase called

A. Taq DNA polymerase

B. RNA polymerase

C. DNA polymerase-III

D. Reverse transcriptase

Answer: A

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Odisha Bureau S Textbook Solutions Very Short Answer Type Questions Fill In The Blanks

1. The phenomenon of fermentation was demonstrated by .....

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2. The word 'biotechnology' was coined by .....

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3. Class II restriction endonucleases (enzymes) recognise specific nucleotide sequence in DNA called .....

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4. Cohesive ends in the DNA fragments are generated by ..... cutting.

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5. The anionic detergent, used in polyacrylamide gel electrophoresis is known as ..... .

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6. Name the process of transfer of protein molecules onto a membrane.

Watch Video Solution

7. Detection of a desired DNA fragment by using radioactive emission is known as

Watch Video Solution

8. The conjoint structure formed by the joining of the vector DNA and the target DNA fragment is known as ..... .

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9. The uptake of the recombinant DNA by the bacterial host cell is known as ..... .

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10. The delivery of a foreign DNA fragment into the fertilised egg with a micropipette is known as ..... .

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Odisha Bureau S Textbook Solutions Very Short Answer Type Questions Express In One Or Two Word S

1. Name the technique used for the separation of DNA fragments.

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2. The restriction endonuclease isolated from Escherichia coli .

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3. The DNA digesting enzyme that removes nucleotides from the termini.

4. The enzyme that catalyses the synthesis of RNA on a DNA template.

5. The enzyme that catalyses the replication of DNA.

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6. The enzyme that catalyses the synthesis of a complementary DNA strand on an RNA template.

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7. The fluorescent dye used in agarose gel electrophoresis.

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8. Transfer of DNA fragments from the agarose gel to a nylon membrane.

Watch Video Solution

9. Breaking of hydrogen bonds in a duplex so as to make it single-stranded.

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10. The DNA that helps carry the target DNA fragment to the host cell for cloning.

Watch Video Solution

11. A plant cell, whose cellulose cell wall is digested.

Watch Video Solution

12. The plasmid present in Agrobacterium tumefaciens.

Watch Video Solution

13. Transfer of a DNA fragment into a host cell in a medium by passing brief pulses of electric current through the medium.

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14. The instrument used in PCR amplification.

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Odisha Bureau S Textbook Solutions Very Short Answer Type Questions Matching

1. Match the words of group 'A' with those of group B to make meaningful pairs

Group-A	Group-B
Restriction endonuclease	End modifying enzyme
DNA ligase	RNA dependent DNA polymerase
Exonuclease	Molecular scissors
Reverse transcriptase	Removes nucleotides from both ends
RNA polymerase	DNA dependent DNA synthesis
DNA polymerase	Molecular glue
Alkaline phosphatase	DNA dependent RNA synthesis

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2. Match the words of group 'A' with those of group B to make meaningful pairs

Group-A	Group-B
Polyacrylamide	*Agrobacterium tumefaciens*
Southern blotting	Thermocycler
Plasmid	Protein electrophoresis
Agarose gel	Denaturation

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Odisha Bureau S Textbook Solutions Short Answer Type Questions

1. Define biotechnology.

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2. Define gene cloning.

3. What is a restriction endonuclease (restriction enzyme)? Why is the word restriction used to designate these?

4. Describe two types of cutting of DNA, executed by restriction endonucleases.

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5. What is electrophoresis? How many types of electrophoresis you have studied?

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6. What is a palindrome? Give an exmaple .

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7. Why is DNA ligase called molecular glue?

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8. What is Southern blotting?

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9. Why is SDS used in polyacrylamide gel electrophoresis?

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10. What is autoradiography?

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11. What are the essential features for an ideal cloning vehicle/vector ?

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12. What is a recombinant DNA?

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13. What is microinjection?

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14. Describe briefly electroporation?

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15. What is polymerase chain reaction

Watch Video Solution

16. Restriction endonuclease

Watch Video Solution

17. Write brief notes on the DNA ligases .

Watch Video Solution

18. Write brief notes on the DNA polymerase .

Watch Video Solution

19. Write brief notes on the Southern blotting .

Watch Video Solution

20. Write brief notes on the Agarose gel electrophoresis.

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21. Write brief notes on the Cloning plasmid .

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22. Write brief notes on the Cosmid .

Watch Video Solution

23. Write Short notes on Recombinant DNA technology

Watch Video Solution

24. What is polymerase chain reaction

Watch Video Solution

25. Write brief notes on the Microinjection .

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Odisha Bureau S Textbook Solutions Long Answer Type Questions

1. Briefly describe the various stages of recombination DNA technology of genetic engineering and its applications.

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Chapter Practice Very Short Answer Type Questions Choose The Correct Option

1. For E. coli vector pBR322, which one of the given options correctly identifies its certain component(s)?

A. ori-original restriction enzyme

B. rop-reduced osmotic pressure

C. Hind III, Eco RI-selectable markers

D. amp^R, tet^R - antibiotic resistance genes

Answer: D

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2. Biolistic (gene gun) technique is used in _____.

A. disarming pathogen vectors

B. transformation of plant cells

C. constructing recombinant DNA by joining with vectors

D. DNA fingerprinting

Answer: B

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3. Which one is a true statement regarding DNA polymerase used in PCR

A. It is used to ligate introduced DNA in recipient cell

B. It serves as a selectable marker

C. It is isolated from a virus

D. It remains active at high temperature

Answer: D

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Chapter Practice Very Short Answer Type Questions Correct The Statements If Required By Changing The Underlined Word S

1. PCR was invented by $\underline{\text{Thomas Rant}}$.

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2. Eco RI is $(\mathrm{type\text{-}I})$ restriction enzyme.

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3. DNA polymerase was discovered by $\underline{\mathrm{Watson}}$.

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4. The most suitable prokaryotic host cell strain is ..... .

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5. Gel electrophoresis is used for :

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Chapter Practice Very Short Answer Type Questions Express In One Or Two Senstence S

1. Define elution.

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2. The screening procedure for transformants involving antibiotic resistance properties.

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Chapter Practice Short Answer Type I Questions

1. An alien piece of DNA needs to be integrated to a specific sequence of host DNA for its cloning. Is it true? if yes, explain.

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2. What is genetic engineering process? Mention its applications

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3. Explain briefly Restriction emzymes and DNA

Watch Video Solution

4. Explain briefly Chitinase

Watch Video Solution

5. Give an account of polymerase enzymes.

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Chapter Practice Short Answer Type Ii Questions

1. Differentiate between the following Southern blotting and Western blotting.

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2. Differentiate between the following Cosmids and Plasmids .

 Watch Video Solution

3. Klenow fragment and Taq polymerase.

 Watch Video Solution

4. Differentiate between Transformation and screening.

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