BIOLOGY

BOOKS - MODERN PUBLISHERS

BIOLOGY (HINGLISH)

BIOTECHNOLOGY : PRINCIPLES AND PROCESSES

Practice Problem

1. What are the three basic steps in genetically modifying as organism ?

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2. Name the two types of restriction enzymes which belong to class nucleases. Mention their functions also.

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3. How fragments of DNA can be separated ? Write the principle on which, this works.

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4. How bacteria take up plasmid during the process of recombinant DNA technology ?

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5. Expand PCR.

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6. What is recombinant proteins?

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Ncert File Ncert Exercise Questions

1. Can you list 10 recombinant proteins which are used in medical practise ? Find out where they are used as therapeutics.

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2. Make a chart (with diagrammatic representation) showing a restriction enzyme, the substrate DNA on which it acts, the site at which it cuts DNA and the product it produces.

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3. From what you have leartn, can you tell whether enzymes are bigger or DNA is bigger in molecular size ? How did you know?

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4. What would be the molar concentration of human DNA in a human cell? Consult your teacher.

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5. Do eukaryotic cells have restriction endonucleases ? Justify your answer.

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6. Besides better aeration and mixing properties, what other advantages do stirred tank bioreactors have over shake flasks?

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7. Collect 5 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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8. Can you recall meiosis and indicate at what stage a recombinant DNA is made?

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9. Can you think and answer how a reporter enzymes can be used to monitor tranformation of host cells by foreign DNA in addition to a selectable marker ?

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10. Describe briefly the following:

(a) Origin of replication.

(b). Bioreactors.

(c). Downstream processing.

11. Explain briefly

(a) PCR

(b) Restriction enzymes and DNA

(c) Chitinase

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12. Discuss with your teacher and find out how to distinguish between

(a) Plasmid DNA and Chromosomal DNA

(b) RNA and DNA (c) Exonuclease and Endonuclease.

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Ncert File Ncert Exemplar Problem A Multiple Choice Questions

1. Rising of dough is due to :

A. multiplication of yeast

B. Production of CO_2

C. Emulsification

D. Hydrolysis of wheat flour starch into sugars

Answer: 3

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2. An enzyme catalysing the removal of nucleotides from the ends of DNA is

A. endonuclease

B. exonuclease

C. DNA ligase

D. Hind -II

Answer: 2

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3. The transfer of genetic material from one bacterium to another through the mediation of a vector like virus is termed as

A. transduction

B. Conjugation

C. Transformation

D. Translation

Answer: a

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4. Which of the given statement is correct in the context of observing DNA separated by agarose gel electrophoresis ?

A. DNA can be seen in visible light

B. DNA can be seen without staining in visible light

C. Ethidium bromide stained DNA can be seen in visible light

D. Ethidium bromide stained DNA can be seen under exposure to UV light

Answer: a

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5. Restriction' in restriction enzyme refers to

A. cleaving of phosphodiester bond in DNA by the enzyme

B. Cutting of DNA at specific position only

C. Prevention of the multiplication of bacteriophage in bacteria

D. All of the above

Answer:

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6. A recombinant DNA molecule can be produced in the absence of the followingt :

A. Restriction endonuclease

B. DNA ligase

C. DNA fragments

D. E.coli

Answer: a

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7. In agarose gel electrophoresis, DNA molecules are separated on the basic of their

 Watch Video Solution

8. The most important feature in a plasmid to be used as a vector is

A. presence of sites for restriction endonuclease

B. Origin of replication (ori)

C. Presence of a selectable marker

D. Its size

Answer: b

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9. While isolating DNA from bacteria, which of the following enzymes is not used ?

A. Lysozyme

B. Ribonuclease

C. Deoxyribonuclease

D. Protease

Answer: a

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10. Which of the following has popularised the PCR (polymerase chain reactions)?

A. Easy availability of DNA template

B. Availability of synthetic primers

C. Availability of cheap deoxyribonucleotides

D. Availability of "Thermostable DNA polymerase

Answer: a

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11. An antibiotic resistance 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: a

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12. Significance of 'heat shock' method in bacterial transformation is to facilitate

A. Binding of DNA to the cell wall

B. Uptake of DNA through membrane transport proteins

C. Uptake of DNA through transient pores in the bacterial cell wall

D. Expression of antibiotic resistance gene

Answer: a

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13. The role of DNA ligase in the construction of a recombinant DNA molecule is :

A. Formation of phosphodiester bond between two DNA fragments

B. Formation of hydrogen bonds between sticky ends of DNA fragments

C. Ligation of all purine and pyrimidine bases

D. None of the above

Answer: a

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14. Which of the following bacteria is not a source of restriction endonuclease?

A. Haemophilus influenzae

B. Escherichia coli

C. Agrobacterium tumefaciens

D. Bacillus amyloli

Answer: a

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15. Which of the following steps are catalysed by Taq polymerase in a PCR reaction ?

A. Denaturation of template DNA

B. Annealing of primers to template DNA

C. Extension of primer end on the template DNA

D. All of the above

Answer: a

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16. A bacterial cell was transformed with a recombinant DNA that was generated using a human gene. However, the transformed cells

did not produce the desired protein. Reason could be

A. Human gene may have intron which bacteria cannot process

B. Amino acid codons for humans and bacteria are different

C. Human protein is formed but degraded by bacteria

D. All of the above

Answer: a

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17. Which of the following should be chosen for best yield if one were to produce a recmobinant protein in large amounts ?

A. Laboratory flask of largest capacity

B. A stirred-tank bioreactor without in-lets and out lets

C. A continuous culture system

D. Any of the above

Answer: a

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18. Who among the following was awarded the Nobal Prize for the development of PCR technique ?

A. Herbert Boyer

B. Hargovind Khurana

C. Kary Mullis

D. Arthur Kornberg

Answer: a

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19. Which of the following statements does not hold true for restriction enzyme?

A. It recognise a pallindromic nucleotide sequence

B. It is an endonuclease

C. It is isolated from viruses

D. It produces the same kind of sticky ends in different DNA molecules.

Answer: a

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Ncert File Ncert Exemplar Problem B Very Short Answer Type Questions

1. How is copy number of the plasmid vector related to yield of recombinant protein?

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2. Would you choose an exonuclease, while producing a recombinant DNA molecule?

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

Watch Video Solution

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

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5. What does competent refer to in competent cells used in transformation experiments?

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6. What is the significance of adding proteases at the time of isolation of genetic material (DNA)?

Watch Video Solution

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

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8. Name a recomblnant vaccine that is currently being used in vaccination program.

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9. Do biomolecules (DNA and protein) exhibit biological activity in anhydrous conditions?

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10. What modification is done on the Ti-plasmid of Agrobacterium tumefacients to convert it into cloning vector?

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Ncert File Ncert Exemplar Problem C Short Answer Type Questions

1. What is meant by gene cloning?

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2. Both a wine maker and a molecular biologist who had developed a recombinant vaccine claim to be biotechnologists. Who in your opinion is correct?

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3. A recombinant DNA molecule was created by ligating a gene to a plasmid vector. By mistake. An exonuclease was added to the tube containing the recombinant DNA. How does

this affect the next step in the experiment, i.e., bacterial trasformation?

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4. Restriction enzymes that are used in the construction of recombinant DNA are endonucleases which cut the DNA at specific recognition sequence? What would be the disadvantage if they do not cut the DNA at specific recogniion sequence?

Watch Video Solution

5. A plasmid DNA and linear DNA (both are of the same size) have one site for restriction endonuclease. When cut and separated on agarose get electrophoresis, plasmid shows one DNA b and, while linear DNA shows two fragments Explain.

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6. How does one visulaise DNA on an agarose gel?

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7. A plasmid without a selectable marker was choosen as vector for cloning a gene. How does this affect the experiment?

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8. 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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9. Describe the role of $CaCl_2$ in the preparation of competent cells?

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10. What would happen when one grows a recombinant bacterium in the biorector but

forget to add antibiotic to the medium in which the recombinant is growing?

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Ncert File Ncert Exemplar Problem D Long Answer Type Questions

1. For selection of recombinants, insertional inactivation of antibiotic marker has been supercoded by insertional inactivation of a

marker gene coding for a chromogenic substrate. Give reasons.

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2. Describe the role of agrobacterium in transforming a plant cell.

Watch Video Solution

3. Illustrate the design of a bioreactor. Highlight the difference between a flask in

your laboratory and a bioreactor which allows cells to grow in a continous culture system.

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Higher Order Thinking Skills Brain Twisting Very Short Answer Questions

1. What is the function of exonuclease ?

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2. Describe a palindrome with the help of an example.

Watch Video Solution

3. What do you mean by Ori?

Watch Video Solution

4. Define selectable marker.

Watch Video Solution

5. What is gene gun?

Watch Video Solution

Higher Order Thinking Skills Brain Twisting Short Answer Questions

1. Name any two cloning vectors. Describe the features required to facilitate cloning into a vector.

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2. How is action of normal endonuclease enzymes different from restriction endonuclease?

Watch Video Solution

3. What is the function of chitinase ?

View Text Solution

4. What is gene therapy ?

View Text Solution

5. A vector is engineered with three features to facilitate its cloning within the host cells. List three features.

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6. In bacterial culture some of the colonies produced blue colour in the presence of chromogenic substrate and some did not due to presence or absence of an inert (rDNA) in the coding sequence of B galactosidase.

(a) Mention the mechanism and steps involved in above experiment.

(b) How is it advantageous over simultaneous plating on two plates having different antibiotics.

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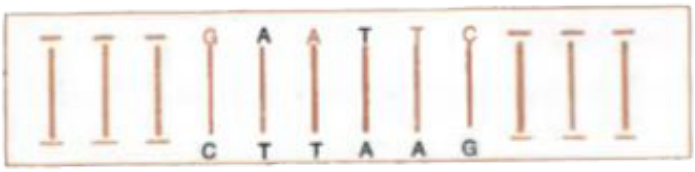
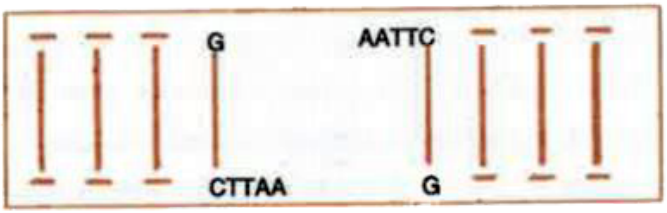
7. Name the particular technique in Biotechnology whose steps are shown in the figure. Use the figure to summarise the technique in three steps:

Watch Video Solution

8. An interesting property of restriction enzymes is molecular cutting and pasting. Restriction enzymes typically recognize a symmetrical sequence of DNA.



Notice that the top strand is the same as the bottom strand, but reads backward. When the enzyme cuts the strand between G and A, it leaves overhanging chains:



A. What is this symmetrical sequence of DNA known as?

B. What is the significance of these overhanging chains?

C. Name the restriction enzyme that cuts the strand between G and A.

View Text Solution

9. Name and explain the techniques used in separation and isolation of DNA fragments to be used in recombinant DNA technology.

Watch Video Solution

10. Explain with reference to PCR

(a) A specific enzyme helps in amplification in PCR. Name the bacterium from which it is isolated and state how its thermostable nature is helpful.

(b) Explain its use in molecular diagnosis.

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Higher Order Thinking Skills Brain Twisting Long Answer Questions

1. Describe the process of amplification of gene of interest

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2. Describe the various vectors for cloning genes in plants and animals.

Watch Video Solution

3. How the DNA can be cut at specific locations

?

Watch Video Solution

4. Describe briefly the following

(a) Bioreactors

(b) Downstream processing

Watch Video Solution

Quick Memory Test A Say True Or False

1. Steward Linn and Wernee Arber (1963) isolated two enzymes which restricted the growth of bacteriophage in bacterium E. coli.

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2. Hind II always join DNA molecules at specific site by recognising a particular sequence of six base pairs.

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3. Exonucleases remove nucleotides at specific positions within DNA.

4. Discovery of enzyme Eco R1 led to award of Nobel Prizes to W. Arber, H. Smith and D. Nathans in 1978.

5. Plasmids are the most widely used cloning vectors in the technique of gene manipulation in bacteria.

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6. Bacteriophages are insects that infect animal cells by injecting their DNA into these cells.

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7. Cosmids has been constructed by combining certain features of plasmid and 'cos' sites of phage lambda.

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8. E.coli is a gram negative bacterium is easy to handle and grow.

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Quick Memory Test B Complete The Missing Links

1. The technique of using live organism or enzymes from organisms to produce products and processes useful to humans.

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2. Arber, Nathan and ..... isolated the first restriction endonuclease.

Watch Video Solution

3. ..... are groups of letters that formed the same words when read from both forward and backward.

 Watch Video Solution

4. Each restriction endonuclease recognises specific palindromic ..... sequences in DNA.

 Watch Video Solution

5. Plasmids and ..... have the ability to replicate within bacterial cells independent of the control of chromosomal DNA.

Watch Video Solution

6. One can ligate a foreign DNA at Bam H, site of tetracycline resistance gene in the vector .....

Watch Video Solution

7. Since DNA is a ..... molecule, it cannot pass through cell membranes.

Watch Video Solution

8. In method called ..... recombinant DNA is directly injected into nucleus of an animal cell.

Watch Video Solution

9. Agarose gel electrophoresis is employed to check the progression of a restriction enzyme .....

Watch Video Solution

10. Plasmids and phages are the ..... which are used for cloning purposes in prokaryotes.

Watch Video Solution

11. There are two general types of plasmids, single copy plasmids and ..... plasmids.

Watch Video Solution

12. The plasmid vector is isolated from bacterial cell and cleaved at one side by restriction .....

Watch Video Solution

13. Recombinant DNA technology is also popularly called as genetic .....

Watch Video Solution

14. There are ..... distinct types of restriction enzymes.

Watch Video Solution

15. DNA ..... enzymes heal the nicks between adjacent nucleotides in double stranded DNA molecule.

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Quick Memory Test C Choose The Correct Alternative

1. A recombinant DNA molecule can be produced in absence of E.coli/Restriction endonuclease.

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2. In bioreactor, stirrer helps in separating/mixing and optimum availability of nutrients to culture cells.

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3. In gel electrophoresis, negatively/positively charged DNA fragments placed over cathode will move towards anode of an electrical field.

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4. Restriction endonuclease/exonuclease attaches itself between the same two bases on the opposite strands and causes aindow break in the two.

View Text Solution

Revision Exercises I Multiple Choice Questions Mcqs

1. Golden rice is a promising transgenic crop. When released for cultivation, it will help in :

A. Alleviation of vitamin A deficiency

B. Pest resistance

C. Herbicide tolerance

D. Producing a petrol-like fuel from rice

Answer: A

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2. Which antibiotic inhibits interaction between tRNA and mRNA during bacterial protein synthesis ?

A. Erythromycin

B. Neomycin

C. Streptomycin

D. Tetracycline

Answer: C

Watch Video Solution

3. Two microbes found to be very useful in genetic engineering are

A. Escherichia coli and Agrobacterium tumefaciens

B. Vibrio cholerae and a tailed bacteriophage

C. Diplococcus sp. and Pseudomonas sp.

D. Crown gall bacterium and Caenorhabditis elegans

Answer: A

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4. Triticale, the first man-made cereal, crop has been obtained by crossing wheat with

A. Rye

B. Pearl millet

C. Sugarcane

D. Barley

Answer: A

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5. Penicillin has inhibitory effect on bacteria through:

A. Stopping entrance of antibody

B. By causing death by destruction of nucleus

C. Inhibition of cell wall formation

D. None of the above

Answer: C

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6. When a viral DNA is incorporated inside the host DNA,it is known as :

A. Prophase

B. Prophage

C. Bacteriophage

D. None of above

Answer: B

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7. DNA element with ability to change its position is called :

A. Cistron

B. Transposon

C. Intron

D. Recon

Answer: B

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8. Genetic material of virus is

A. RNA only

B. DNA only

C. Both RNA and DNA

D. Either DNA or RNA

Answer: D

 Watch Video Solution

9. Restriction endonucleases are most widely used in recombinant DNA technology. They are obtained from

A. Plasmids

B. All prokaryotic cells

C. Bacteriophages

D. Bacterial cell

Answer: D

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10. Variable number of tandem repeates (VTNRs) in the DNA molecule are highly useful in :

A. Monoclonal antibody production

B. Stem cell culture

C. Recombinant DNA technology

D. DNA fingerprinting

Answer: D

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11. Monoclonal antibodies are produced from hybrid cells, called hybridomas. The cells employed to obtain these hybridoma cells are:

A. T-lymphocytes and myeloma cells

B. B-lymphocytes and carcinoma cells

C. B-lymphocytes and myeloma cells

D. Lymphoma cells and bone marrow cell

Answer: C

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12. Restriction endonucleases

A. Are present in mammalian cells for degradation of DNA when the cell dies

B. Are used in genetic engineering for ligating two DNA molecules

C. A used in vitro DNA synthesis

D. Are synthesized by bacteria as part of their defence mechanism

Answer: D

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13. Protoplast fusion was first established by :

A. Mendel

B. Bateson

C. Cocking

D. Skong

Answer: C

Watch Video Solution

14. An institution where valuable plant material-likely to become irretrievably lost in the wild or in cultivation is preserved in a viable condition, is known as

A. Genome

B. Gene library

C. Gene bank

D. Herbarium

Answer: C

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Revision Exercises Ii Very Short Answer Type Questions A Question From State Board Examinations

1. What are exonucleases and endonucleases?

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2. Write one use of PCR technique.

Watch Video Solution

3. How is copy number of the plasmid vector related to yield of recombinant protein?

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4. Do biomolecules (DNA and protein) exhibit biological activity in anhydrous conditions?

5. What does competent refer to in competent cells used in transformation experiments?

6. Plasmids and viruses are most commonly used vectors. Write True or False.

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7. Most suitable mathod of introducing alien DNA into a plant cell is

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8. Expand the term ELISA.

Watch Video Solution

9. What is a clone

Watch Video Solution

10. Molecular scissor is:

A. Restriction endonuclease

B. Helicase

C. Urease

D. Peptidase

Answer:

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11. In biotechnology, which two enzymes are commonly called 'molecular scissor' and 'molecular glue?

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12. What is the full form of VNTR?

Watch Video Solution

13. Somatic hybridisation can be done by:

A. Protoplast fusion

B. Cell culture

C. Haploid anther

D. Pollen culture

Answer:

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14. The first step of genetic engineering is:

A. Isolation of proteins

B. Isolation of RNA

C. Isolation of genetic material

D. Isolation and purification of protein

Answer:

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15. What is bioreactor?

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Revision Exercises Ii Very Short Answer Type Questions B Question From Cbse Board Examinations

1. A plasmid and a DNA sequence in a cell need to be cut for producing recombinant DNA.

Name the enzyme which acts as a molecular scissors to cut the DNA segments.

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2. Expand the following:

(i) PCR, (ii) Bt

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3. Provide one word or one sentence information about 'plasmid' with respect to its

(i) chemical nature and (ii) its duplication.

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4. What acts as a 'molecular scissors' in biotechnology?

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5. In plants, how is alien DNA introduced into the host cell?

Watch Video Solution

6. Biotechnologists refer to Agrobacterium tumifaciens as a natural genetic engineer of plants. Give reasons to support the statement.

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7. Which main technique and instrument is used to isolate DNA from a plant cell?

Watch Video Solution

8. What are selectable markers? Give two examples.

9. Expand PCR and mention one application of this.

10. Mention the type of host cells suitable for the gene guns to introduce an alien DNA.

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11. Molecular scissors used in recombinant DNA technology are known as.....

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12. Give the name of the bacterium other than E. coli, which is used in recombinant DNA technology.

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Revision Exercises Iii Short Answer Type I Questions A Question From State Board Examinations

1. Expand the following (a) PCR (b) ELISA (c) DNA

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2. Gene therapy aims in correcting diseases caused by defective genes. A child is suffering from a disease due to deficiency of ADA enzyme. ADA gene which normally produces the enzyme is missing in the patient. Recommend any two methods to treat the child.

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3. Gel electrophoresis is a technique to separate fragments of DNA from a mixture. Some of the events of electrophoresis are given below. Arrange the events in order.

(i) Cut out DNA bands (ii) Expose to UV (ii) Force DNA to move through gel (iv) Stain DNA with ethidium bromide.

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4. Besides better aeration and mixing properties, what other advantages do stirred

tank bioreactors have over shake flasks?

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5. What are cloning vectors? Name one common vector used in experiments.

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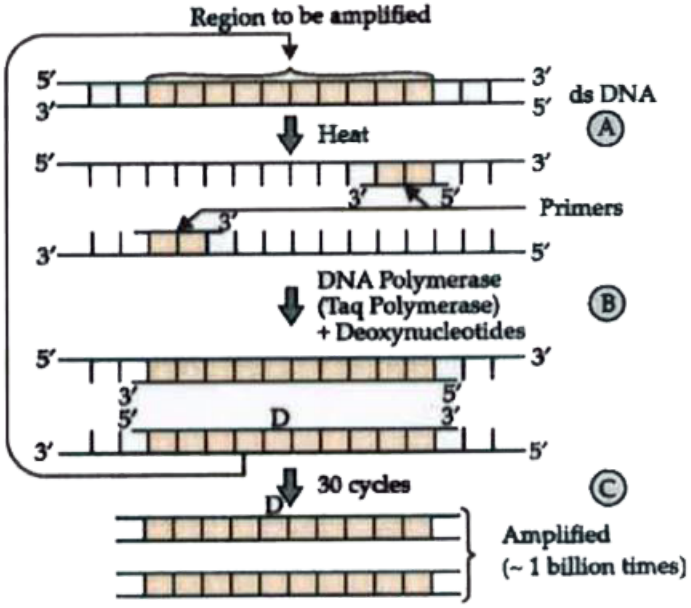
6. Figure representing the reactions associated with Polymer Chain Reaction (PCR).

Name the steps A, B, C in the process.



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7. BIOTECHNOLOGY & ITS PRINCIPLES

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8. Write two significance of Bioreactors

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9. What do you mean by term 'cloning' ?

Watch Video Solution

10. How does restriction endonuclease work?

Watch Video Solution

11. What are Molecular Scissors? Give one example.

Watch Video Solution

12. Write a short note on bioreactor.

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13. DOWNSTREAM PROCESSING

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14. What is DNA probe? What are its uses?

Watch Video Solution

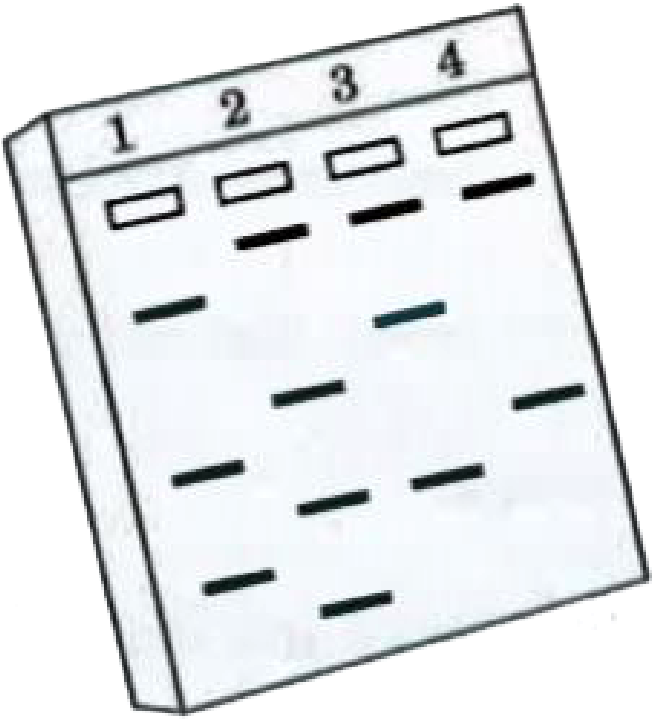
15. The following photograph shows the result of a technique showing the separation of DNA.

(a) Name the technique.

(b) How the separated DNA is visualized?

(c) DNA fragments of size 500 bp, 1600 bp and 2000 bp are separated by this process. Which

fragment will migrate fast. Why?



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16. Different methods have been suggested to introduce alien DNA into host cells. Give and

explain any three methods adopted for this purpose.

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17. Write the methods to introduce alien DNA into host cells?

Watch Video Solution

18. Draw a neat labelled diagram of plasmid pBR322.

Watch Video Solution

19. What is the role of Ori for cloning vector?

Watch Video Solution

20. Write the full name of ELISA.

Watch Video Solution

21. Meaning of prefix 'Bt' in 'Bt' cotton is:

A. Bacterial Toxin

B. Biological Toxin

C. Toxin released by Bacillus thuringiensis

D. Biotechnology.

Answer:

 Watch Video Solution

22. Enzymes that cut the DNA at desired points:

A. Ligases

B. Restriction Endonucleases

C. Polymerases

D. Gyrases.

Answer:

Watch Video Solution

23. What is endonuclease? What do you mean by restriction site?

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Revision Exercises Iii Short Answer Type I Questions B Question From Cbse Board Examinations

1. State principle underlying 'gel electrophoresis' and mention two applications of this technique in biotechnology.

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2. How has Agrobacterium tumefaciens has been suitably modified to act as cloning vector?

Watch Video Solution

3. Write a specific palindromic nucleotide sequence in DNA that is recognised by Eco RI.

(b) What does Eco RI stand for?

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4. Write the full form of VNTR. How is VNTR different from Probe

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5. Explain the work carried out by Cohen and Boyer that contributed immensely in biotechnology.

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6. Write the role of 'Ori' and 'restriction' site in a cloning vector pBR322.

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7. How does a restriction nuclease function ? Explain.

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8. Name the technique by which Gene expression can be controlled with the help of RNAi molecule.

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Revision Exercises Iv Short Answer Type Ii Questions A Question From State Board Examinations

1. Bacillus thuringiensis has great potential in biological control of pests. Discuss.

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2. What are molecular scissors? Explain their role in recombinant DNA technology.

Watch Video Solution

3. What does PCR stand for? Write its principle and name the different steps involved in PCR.

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4. What is DNA probe? Write its two uses.

Watch Video Solution

5. What are molecular scissors? Explain their role in rDNA technology.

Watch Video Solution

6. Draw a neat labelled diagram showing steps of PCR.

Watch Video Solution

7. Enlist the steps involved in solving disputed parentage by DNA profiling.

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8. How is insertion of recombinant DNA done in host cell (organ)?

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9. What is a 'marker gene' ? Mention two common selectable markers.

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10. Discuss direct method of gene transfer.

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11. How can bacterial cell be made competent to take up DNA?

Watch Video Solution

12. Rearrange the following in the correct sequence to accomplish an important biotechnological reactions :

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

(b) Chemically synthesized 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 ds-DNA

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13. Explain briefly polymerase chain reaction.

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14. Define Genetic Engineering. Mention the steps of Genetic Engineering Process.

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15. Explain the role(s) of the following Biotechnology:

a) Restriction endonuclease

Gel-electrophoresis

c) Selectable markers in pBR322.

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16. Write the stpes you would suggest to be undertaken to obtain a foreign-gene-product.

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17. Write a brief account of genetically engineered Insulin

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18. What is EcoRI? Write the palindromic nucleotide sequence recognized by it. State the role of EcoRI in Biotechnology.

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19. Why is it difficult for DNA to pass through cell membrane? How is a bacterial cell made competent to take up DNA (plasmid)?

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20. How are the desired DNA sequence used in biotechnology cut? Explain the technique used to separate the cut fragments.

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21. Name the selectable markers in the cloning vector pBR322? Mention the role of they play.

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22. What is a cloning vector? Describe briefly the characteristics a cloning vector must possess.

 Watch Video Solution

23. A small fragment of skin of a different person was extracted from the nails of a murdered person. This fragment of skin led the crime investigators to the murderer. Based on this incident answer the following

questions:

(i) What technique was used by the investigators?

(ii) What is the procedure involved in this technique?

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24. What do you mean by GM organisms? Mention any three advantages of GM organisms.

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25. What is recombinant DNA technology? What are its applications?

Watch Video Solution

26. What are plamids? What is their role in biotechnology?

Watch Video Solution

27. (a) Differentiate YAC and BAC.

(b) What are Bioreactors? What is their utility?

(c) Where Lactobacillus is used commercially?

Watch Video Solution

28. What are molecular scissors? Give an example.

Watch Video Solution

29. What are molecular scissors?

Watch Video Solution

30. Describe the essential steps in Genetic Engineering.

Watch Video Solution

31. What is the function of Restriction Endonuclease in recombinant DNA

technology?

A. Link together fragments of DNA

B. Make millions of copies of DNA

C. Cut DNA into many fragments

D. Separate fragments of DNA

Answer:

32. (a) Explain PCR.

(b) How desired DNA is isolated in recombinant DNA technology?

(c) Define Plasmid.

Watch Video Solution

33. PCR and ELISA are two molecular diagnostic techniques.

(a) How is PCR useful in molecular diagnosis?

(b) What is the principle of ELISA?

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34. Many countries encourage the cultivation of Genetically Modifed Crops (G.M. Plants). Write any two advantages of GM plants.

Watch Video Solution

35. With reference to gel electrophoresis, what is elution?

Watch Video Solution

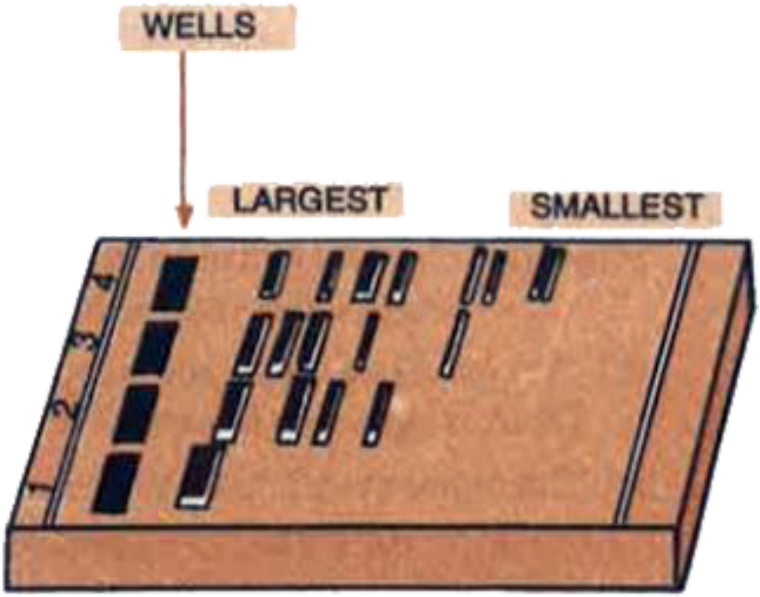
Revision Exercises Iv Short Answer Type Ii Questions B Question From Cbse Board Examinations

1. (a) What does this diagram depict?

(b) What is meant by the largest and the smallest in the picture.

(c) Name the compound used to visualise them.

(d) Define elution



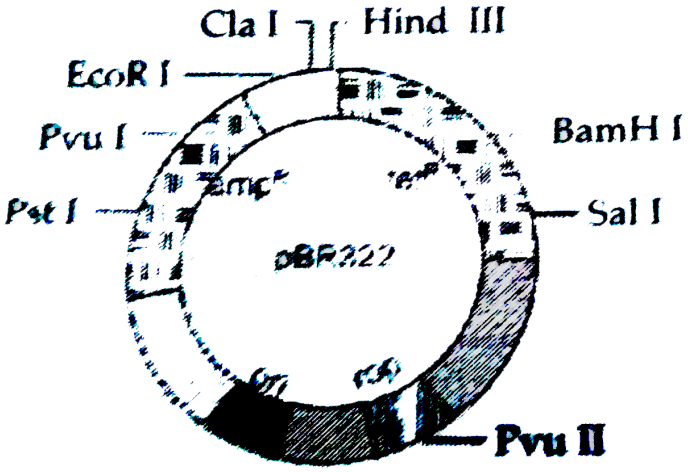
Watch Video Solution

2. (i) Name the organism in which the vector shown in inserted to get the copies of the

desired gene.

(ii) Mention the area labelled in the vector responsbile for controlling the copy number of the inserted gene.

(iii) Name and explain the role of a selectable marker in the vector shown.



Watch Video Solution

3. Draw a schematic sketch of pBR 322 plasmid and label the following in it:

(a) Any two restriction sites.

(b) Ori and rop genes.

(c) An antibiotic resistant gene.

Watch Video Solution

4. A vector is engineered with three features which facilitate its cloning within the host cell. List the three features and explain each one of them.

Watch Video Solution

5. Discuss the role, the enzyme DNA ligase plays during DNA replication.

Watch Video Solution

6. Explain enzyme-replacement therapy to treat adenosine deaminase deficiency Mention two disadvantages of this procedure.

Watch Video Solution

7. (a) Name the selectable markers in the cloning vector pBR322 ? Mention the role they play.

(b) Why is the coding sequence of an enzyme b-galactosidase a preferred selectable marker in comparison to the ones named above ?

Watch Video Solution

8. Describe the roles of heat , primers and the bacterium Thermus aquaticus in the process

of PCR.

Watch Video Solution

9. Explain the various steps involved in the productin of artifical insulin

Watch Video Solution

10. (a) Explain the significance of palindromic nucleotide sequence in the formation of recombinant DNA.

(b) Write the use of restriction endonuclease in the process.

Watch Video Solution

11. a) While cloning vectors, which of the two will be preferred by biotechnologists bacteriophases or plasmids, Justify with reason.

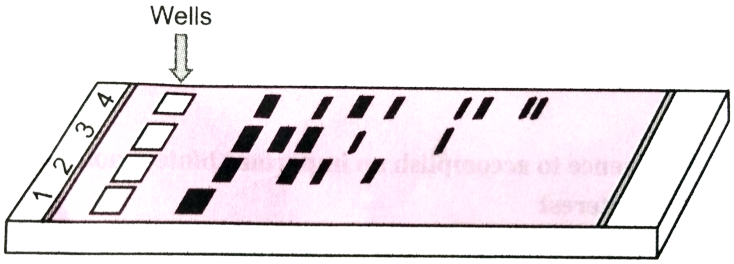
b) Name the first transgenic cow developed and state the improvement in the quality of the product produced by it.

Watch Video Solution

12. a) How do DNA fragments migrate and resolve in a Gel electrophoresis?

b) How lane one is different from lane 2,3 and 4 in the GEL electrophoresis set up?

c) How pure DNA fragments are made observable in the visible light?



Watch Video Solution

13. (a) Why must a cell made 'compelent' in biotechnology experiments ? How does calcium ion help in doing so ?

(b) State the role of 'biolistic gun' in biotechnology experiments.

Watch Video Solution

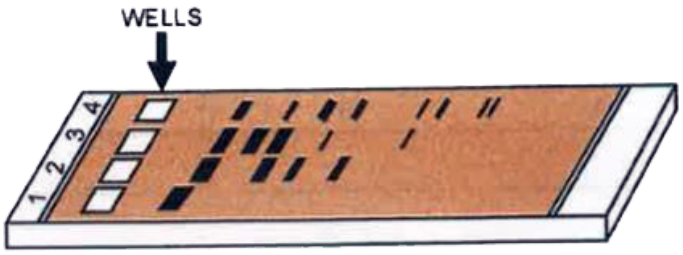
14. What is Ori? State its importance during cloning of vector.

Watch Video Solution

15. Explain the importance of 'selectable marker' with the help of suitable example.

Watch Video Solution

16. Given below is the diagram of agarose gel kept under UV light:



(a) Mention the positive and negative terminals.

(b) What is the charge carried by DNA molecule and how does it help in its separation?

(c) How are the separated DNA fragments finally isolated?

Watch Video Solution

17. (a) In pBR322, foreign DNA has to be introduced in Tet^R region. From the

restriction enzymes given below, which one should be used and why: Pvul, EcoRI, BamHI. (b) Give reasons, why the other two enzymes cannot be used.

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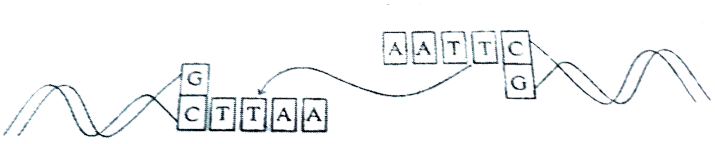
Revision Exercises V Case Based Short Answer Type Questions

1. 

study the linking of DNA fragments shown

above.

(i) Name ‘a’ DNA and ‘1” DNA.

(ii) Name the restriction enzyme that recognises this Palindrome,

(iii) Name the enzyme that can link these two DNA fragments.

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Revision Exercises Vi Long Answer Type Ii Questions A Question From State Board Examinations

1. In plants how alien DNA introduced into host cell?

Watch Video Solution

2. (a) Differentiate between plasmid DNA and chromosomal DNA.

(b) Differentiate between exonuclease and endonuclease.

Watch Video Solution

3. Explain the gene gun method of DNA introduction into host cell.

Watch Video Solution

4. Discuss shuttle vectors.

Watch Video Solution

5. How is the amplification of a gene sample of interest carried out using Polymerase Chain

Reaction (PCR)?

Watch Video Solution

6. What are cloning vectors? Describe the characteristics of a cloning vector.

Watch Video Solution

7. What are restriction endonuclease enzymes? Explain how restriction endonuclease enzymes are named.

Watch Video Solution

8. Describe bioreactor along with its advantages.

Watch Video Solution

9. How isolation and separation of DNA fragments is done ?

Watch Video Solution

10. Explain any two methods for introduction of recombinant DNA into host cell.

Watch Video Solution

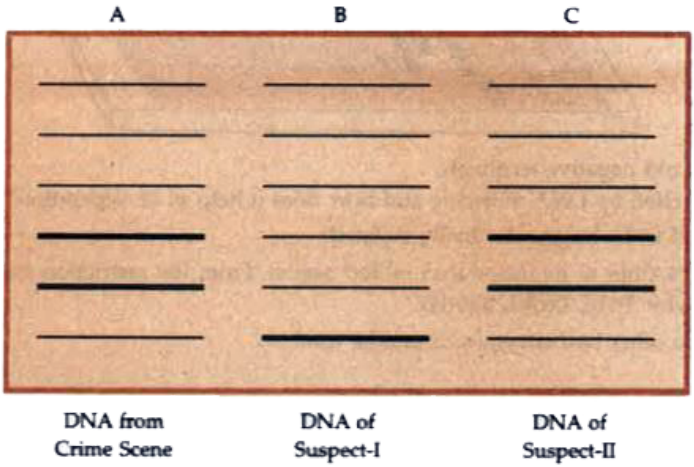
11. Explain PCR. How it helps in amplification of gene of interest?

Watch Video Solution

12. With an example, explain the convention for naming restriction endonuclease scientifically.

Watch Video Solution

13. The diagrammatic representation of the DNA fingerprint from a crime scene and that of a suspected persons are given below:



(a) What is your conclusion about the suspects based on DNA Fingerprint given?

(b) What is VNTR?

(c) Who developed this technique first?

Watch Video Solution

14. Recombinant DNA technology is a complex process which involves several steps. Write down the major steps in recombinant DNA technology.

Watch Video Solution

15. The discovery of Restriction Endonuclease is considered as "milestone" in the history of genetic engineering. (a) Which is the first discovered restriction endonuclease? (b) What

are the criteria for naming of restriction endonuclease?

Watch Video Solution

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

Watch Video Solution

17. What is recombinant DNA technology ? Write its steps.

Watch Video Solution

Revision Exercises Vi Long Answer Type Ii Questions B Question From Cbse Board Examinations

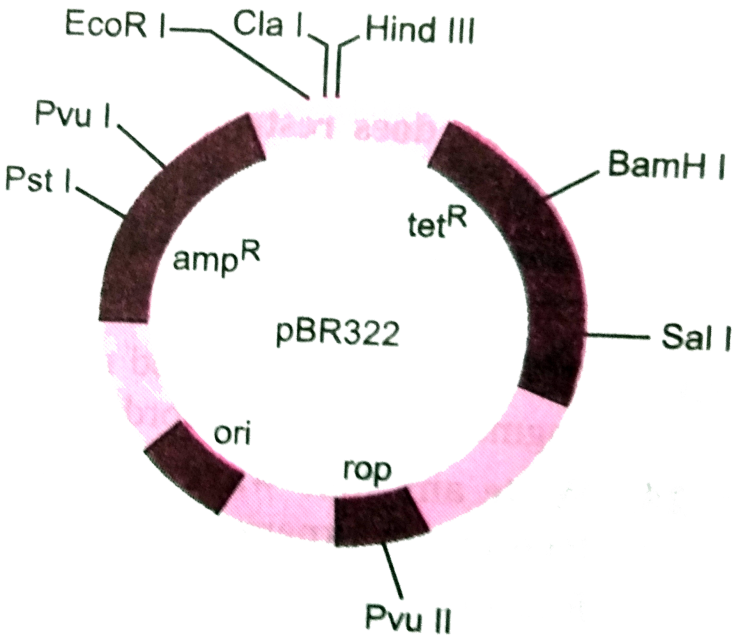
1. Name any two cloning vectors. Describe the features required to facilitate cloning into a vector.

Watch Video Solution

2. Why is Agrobacterium tumefaciens a good cloning vector ? Explain.

Watch Video Solution

3. Explain the importance of a) ori, b) amp^R and c) rop in the E, coli vector shown below:



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4. (a) Mention the role of vectors in recombinant DNA technology. Give any two examples.

(b) With the help of diagrammatic representation only show the site of DNA technology.

Watch Video Solution

5. (a) What is a plasmid?

(b) What is meant by ADA deficiency? How is gene therapy a solution to this problem? Why is it not a permanent cure?

Watch Video Solution

6. (i) Describe the characteristics that a cloning vector must posses.

(ii) why DNA can not pass through the cell membrane ? Explain. How is a bacterial cell made 'competent' to take up recombinant DNA from the medium ?

Watch Video Solution

7. If a desired gene is identified in an organism for some experiments, explain the process of the following

(i) Cutting this desired gene at specific location

(ii) Synthesis of multiple copies of this desired gene

Watch Video Solution

8. Explain the application of rDNA technology to produce insulin.

Watch Video Solution

9. (a) Describe the different steps in one complete cycle of PCR.

(b) State the purpose of such an amplified DNA sequence.

Watch Video Solution

10. (a) Why must a cell made 'compelent' in biotechnology experiments ? How does calcium ion help in doing so ?

(b) State the role of 'biolistic gun' in biotechnology experiments.

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Competition File Objective Type Question A Multiple Choice Questions Mcqs

1. The construction of the first recombinant DNA was done by using the native plasmid of

A. E.coli

B. Salmonella typhimurium

C. B. thuringiensis

D. Yeast

Answer: B

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2. The basis of DNA fingerprinting is :

A. The double helix

B. Errors in base sequence

C. Polymorphism in sequence

D. DNA replication

Answer: C

 Watch Video Solution

3. Polymerase chain reaction is most useful in

A. DNA synthesis

B. DNA amplification

C. Protein synthesis

D. Amino acid synthesis

Answer: B

Watch Video Solution

4. What is the first step in the Southern Blot technique

A. Denaturation of DNA on the gel for hybridization with specific probe

B. Production of a group of genetically identical cells

C. Digestion of DNA by restriction enzyme

D. Denaturation of DNA from a nucleated cell such as the one from the scene of crime

Answer: C

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5. The autonomously independent self replicating extranuclear DNA imparting cartain factors to some bacterium is called:

A. Plastid

B. Plasmid

C. Phagemid

D. Cosmid

Answer: B

 Watch Video Solution

6. Plasmids are extra chromosomal genetic material of

A. Bacteria

B. Virus

C. Algae

D. Amoeba

Answer: A

Watch Video Solution

7. Molecular scissor is :

A. Restriction endonuclease

B. Helicase

C. Urease

D. Peptidase

Answer: A

Watch Video Solution

8. Some clones are obtained by:

A. Tissue culture

B. Plant breeding

C. Irradiation

D. Genetic engineering

Answer: A

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9. Which one of the following is commonly used in transfer of foreign DNA into crop plants?

A. Trichoderma harzianum

B. Meloidogyne incognita

C. Agrobacterium tumefaciens

D. Penicillium expansum

Answer: C

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10. Polyethylene glycol method is used for

A. Gene transfer without a vector

B. Biodiesel production

C. Seedless fruit production

D. Energy production from sewage

Answer: A

 Watch Video Solution

11. This method of finding a gene is used when researchers know very little about the gene they are trying to find. This process results in a complete gene library: a collection of copies of

DNA fragments that represent the entire genome of an organism:

A. Cloning

B. Shotgun cloning

C. Gene synthesis cloning

D. PCR

Answer: B

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12. First genetically modified plant commercially released in India is:

A. Golden rice

B. Slow ripening tomato

C. Bt-brinjal

D. Bt-cotton

Answer: D

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13. Cloning does not provide :

A. Same morphological character

B. Variation

C. Same genetic character

D. All of the above

Answer: B

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14. 'Transgenic' plants are produced by :

A. Inducing gene mutation

B. Arresting spindle fibre formation

C. Deleting sex chromosomes

D. Introduction of foreign genes

Answer: D

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15. Source of Taq polymerase used in PCR is a

A. Thermophilic fungus

B. Mesophilic fungus.

C. Thermophilic bacterium

D. Halophilic bacterium

Answer: C

Watch Video Solution

16. Restriction enzymes

A. Restrict elongation of DNA

B. Cut DNA at specific locations

C. Link together two pieces of DNA

D. Restrict DNA replication

Answer: B

Watch Video Solution

17. Cloning gene is process where:

A. Gene is cloned in an animal

B. Fragments of DNA are transferred from one organism to another , usually

carried on a DNA vector

C. Fragments of DNA cloned in the same organism using carrier

D. DNA is cloned in plants

Answer: B

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18. Enzyms that cleaves nucleic acids within the polynucleotide chain is known as

A. Endonuclease

B. Exonuclease

C. Arylsulfatase

D. Phosphotriesterase

Answer: A

Watch Video Solution

19. The vector for T-DNA is :

A. Thermus aquaticus

B. Salmonella typhimurium

C. Agrobacterium tumefaciens

D. Escherichia coli

Answer: A

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20. Which of the following is a plasmid ?

A. pBR 322

B. BamH-I

C. SAl-I

D. Eco R-I

Answer: A

Watch Video Solution

21. The technique of DNA fingerprinting was initially developed by :

A. Ian Wilmut

B. Hargobind Khorana

C. Jacque Monod

D. Alec Jeffreys

Answer: D

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22. In genetic engineering, a DNA segment (gene) of interest, is translated to the host cell through a vector. Consider the following four agents (A-D) in this regard and select the correct option about which one or more of

these can be used as a vector/vectors

Statement

(A) A bacterium (B) Plasmid

(C) Plasmodium (D) Bacteriophage

A. (i), (ii) & (iv)

B. (i) only

C. (i) & (iii)

D. (ii) & (iv)

Answer: D

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23. Which of the following are used in gene cloning ?

A. Nucleoids

B. Lomasomes

C. Mesosomes

D. Plasmids

Answer: D

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24. Which one of the following techniques made it possible to gnetically engineer living organisms ?

A. Heavier isotope labelling

B. Hybridization

C. Recombinant DNA technique

D. X-ray diffraction

Answer: C

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25. In the PCR technology the DNA segment is replicated over a billion times. This repeated replications catalyzed by the enzyme

A. DNA polymerase

B. Taq polymerase

C. DNA dependent RNA polymerase

D. Primase

Answer: B

 Watch Video Solution

26. What is the source of the Ti (Tumour inducing) plasmid which is modified and used as a cloning vector to deliver the desirable genes into plant cells ?

A. Agrobacterium tumefaciens

B. Thermophilus aquaticus

C. Polycoccus furiosus.

D. Aedes aegypti.

Answer: A

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27. In hybridoma technology:

A. B-cells are fused with myeloma cells

B. T-cells are fused with myeloma cells.

C. B-cells are fused with T-cells

D. None of the above

Answer: A

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28. If a recombinant DNA bearing gene for ampicillin resistance if transferred into E.Coli cells and the host cells are spread on agar plates containing ampicillin, then:

A. Both transformed and untransformed recipient cells will die

B. Both transformed and untransformed recipient cells will grow

C. Transformed recipient cells will grow and untransformed recipient cell will die

D. Transformed recipient cells will die and untransformed recipient cells will grow

Answer: C

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29. The Human Immunodeficiency Virus causes AIDS by:

A. Depleting CD_4^+ T-helper lymphocytes

B. Increasing CD_4^+ T-helper lymphocytes

C. Depleting CD_4^- T-helper lymphocytes

D. IncreasingCD_4^- T-helper lymphocytes

Answer: A

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30. Thermostable enzymes 'Taq and Pfu' isolated from thermophilic bacteria are

A. RNA polymerase

B. DNA polymerases

C. Restriction endonucleases

D. DNA ligases

Answer: B

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31. The term "molecular scissors" generally refers to

A. DNA polymerases

B. RNA polymerases

C. Restriction endonucleases

D. DNA ligases

Answer: C

Watch Video Solution

32. A linear polymeric biomolecule with reducing and non-reducing ends is

A. RNA

B. DNA

C. Protein

D. Amylose

Answer: C

 Watch Video Solution

33. If the length of a double helical DNA if 1.7 meters then the number of base pairs present in the DNA is

A. 5×10^9

B. 1.7×10^9

C. 3.4×10^9

D. 1.7×10^5

Answer: A

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34. Read statements a-d. Which two of them have mistakes

(a) First transgenic buffalo Roise produced milk which was human alpha-lactalbumin

enriched

(b) Restriction enzymes are used in isolation of DNA from other macromolecules

(c) Downstream processing is one of the steps of rDNA technology

(d) Disarmed pathogen vectors are also used in transfer of rDNA into the host

A. Statements (A) and (C)

B. Statements (A) and (B)

C. Statements (B) and (C)

D. Statements (C) and (D)

Answer: B

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35. There is a restriction endonuclease called Eco RI. What does 'co' part in it stand for ?

A. Colon

B. Coelom

C. Coenzyme

D. Coli

Answer: D

Watch Video Solution

36. Gene amplification using primers can be done by :

A. Microinjection

B. ELISA

C. Polymerase chain reaction

D. Gene gain

Answer: C

Watch Video Solution

37. Alec Jeffreys developed the DNA fingerprinting technique. The probe he used was :

A. Ribozyme

B. Sex chromosomes

C. SNP

D. VNTR

Answer: D

 Watch Video Solution

38. Automated DNA sequencers, work on the peinciple of the method developed by

A. Erwin Chargaff

B. Maurice Wilkins

C. Frederick Sanger

D. Francis Crick

Answer: C

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39. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells):

A. Both sense and anti-sense RNA

B. A particular hormone

C. An antifeedant

D. A toxic protein

Answer: A

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40. Biolistics (gene-gun) is suitable for

A. disarming pathogen vectors

B. transformation of plant cells

C. constructing recombinant DNA by joining with vectors

D. DNA fingerprinting

Answer: B

Watch Video Solution

41. In genetic engineering, the antibiotics are used

A. As selectable markers

B. To select healthy vectors

C. As sequences from where replication starts

D. To keep the cultures free of infection

Answer: A

 Watch Video Solution

42. In biotechnical processes cDNA is prepared from:

A. B-DNA

B. hn RNA

C. Z-DNA

D. mRNA

Answer: D

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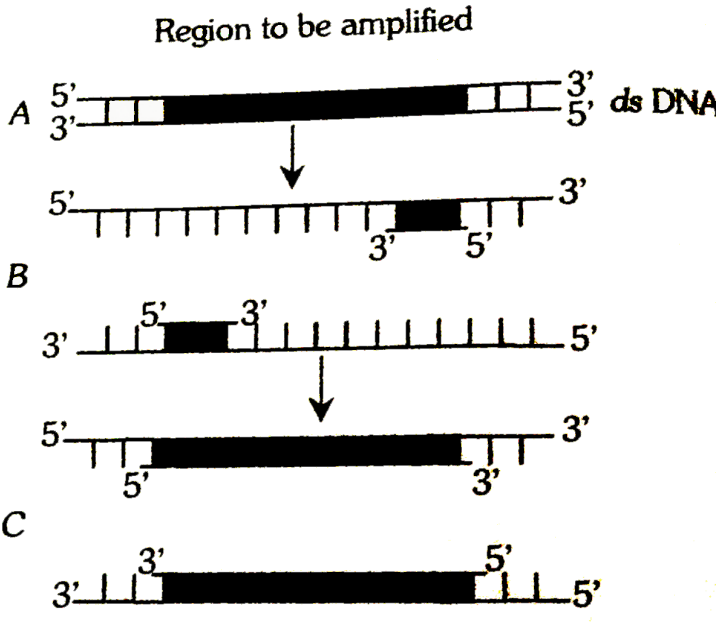
43. The figure below shows three steps (A,B,C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification togather

with what it represents



A. B-denaturation at a temperature of about $98^{\circ}C$ separating the two DNA strands.

B. A - denaturation at a temperature of about $50^{\circ} C$.

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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44. It is normally a rare cancer but became a marker for AIDS/HIV patients

A. Squamous cell carcinoma

B. Retinoblastoma

C. Kaposi's sarcoma

D. Lukaemia

Answer: C

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45. Cohen and Boyer isolated an antibiotic resistance gene, by cutting out a piece of DNA from a plasmid which was responsible for conferring antibiotic resistance, in the year

A. 1962

B. 1965

C. 1972

D. 1982

Answer: C

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46. Restriction enzyme Eco RI cuts the DNA between bases G and A only when the sequence in DNA is

A. GATATC

B. GAATTC

C. GATTCC

D. GAACTT

Answer: B

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47. Amplification of gene of interest by using DNA polymerase may go upto

A. 0.1 million times

B. 1.0 million times

C. 1.0 billion times

D. 1.0 trillion times

Answer: C

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48. In a genetic engineering experiment restriction enzymes can be used for :

A. Bacterial DNA only

B. Viral DNA only

C. Any DNA fragment

D. Eukaryotic DNA only

Answer: C

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49. Which of the following is used to select genes of interest from a genomic liberary

A. Restriction enzymes

B. Cloning vectors

C. Gene targets

D. DNA probes

Answer: D

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50. 'YAC'' refers to :

A. Yeast artificial cell

B. Yeast artificial chromosome

C. Yeast artificial colony

D. None of the above

Answer: B

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51. During amplification of gene using PCR Taq polymerase is used between:

A. Denaturation and annealing

B. Annealing and extension

C. Extension and amplification

D. None of the above

Answer: C

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52. Which enzyme cuts DNA at specific sites?

A. DNA polymerase

B. Taq-polymerase

C. Topoisomerase

D. Restriction endonuclease

Answer: D

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53. The cutting of DNA at specific locations became possible with the discovery of

A. Selectable markers

B. Ligases

C. Restriction enzymes

D. Probes

Answer: C

 Watch Video Solution

54. Restriction endonucleases

A. Are synthesised by bacteria as part of their defense mechanism.

B. Are used for in vitro DNA synthesis.

C. Are used in genetic engineering for ligation of two DNA molecules.

D. Are present in mammalian cells for degradation of DNA when the cell dies.

Answer: A


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55. A desirable change in genotype of an organism is obtained by

A. DNA replication

B. Protein synthesis

C. DNA technology

D. mRNA formation

Answer: C

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56. With respect to DNA fragmentation

Statement A: Gel electrophoresis and elution are two important processes

Statement B : After staining with ethidium bromide, it has to be exposed to UV light

A. Only A is correct

B. Both A and B are correct statements

C. Only B is correct

D. Only A is correct and B is incorrect.

Answer: B

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57. Which of the following restriction enzymes produces blunt ends

A. Xho1

B. Hind III

C. Sal I

D. Eco RV

Answer: D

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58. The mechanism that causes a gene to move from one linkage group to another is called

A. Translocation

B. Crossing-over

C. Inversion

D. Duplication

Answer: A

 Watch Video Solution

59. A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using

A. Polymerase I

B. Ligase

C. Eco RI

D. Tag Polymerase

Answer: B

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60. Which of the following is not required for any of the techniques of DNA fingerprinting available at present

A. Polymerase chain reaction

B. Zinc fingu analysis

C. Restriction enzymes

D. DNA-DNA hybridization

Answer: B

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61. Which of the following is a restriction endonuclease ?

A. Hind II

B. Protease

C. DNA re-I

D. RNA re

Answer: B

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62. Which of the following is not a feature of the plasmids

A. Independent replication

B. Circular structure

C. Transferable

D. Single stranded

Answer: D

Watch Video Solution

63. The taq polymerase enzyme is obtained from

A. Thermus aquatious

B. Thiobacillus ferrooxidans

C. Bacillus subtilis

D. Pseudomonas putida

Answer: B

Watch Video Solution

64. Which of the following r-RNAs acts as structural RNA as well as ribozme in bacteria ?

A. 55 r RNA

B. 185 r RNA

C. 235 r RNA

D. 5.85 r RNA

Answer: C

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65. Stirred-tank bioreactors have been designed for :

A. Purification of product

B. Addition of preservatives to the product

C. Availability of oxygen through the process

D. Ensuring an aerobic condition is the where vessel

Answer: C

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66. The DNA fragments separated on an agarose gel can be visualised after staining with

A. Acetocarmine

B. Aniline blue

C. Ethidium bromide

D. Bromophenol blue

Answer: C

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67. Which of the following are not polymeric

A. Proteins

B. Polysaccharides

C. Lipids

D. Nucleic acid

Answer: C

Watch Video Solution

68. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes ?

A. Ti plasmid

B. α phage

C. Retrovirus

D. pBR 322

Answer: C

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69. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.

A. The enzyme cuts DNA molecule at identified position within the DNA

B. The enzyme binds DNA at specific sites and cuts only one of the two strands.

C. The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.

D. The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.

Answer: B

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Competition File Objective Type Question B Matching Type Question

1. Matching Type Questions :

Column A	Column B
(i) Plasmid	(a) Jeffreys
(ii) Father of DNA Fingerprinting	(b) Gel electrophoresis
(iii) Recombinant DNA Technology	(c) Vector
(iv) Restriction enzyme	(d) Gene transfer
(v) Macromolecular separation	(e) Extra-chromosomal, self replicating
(vi) Cloning vehicles	(f) Bioreactors
(vii) *Agrobacterium tumefaciens*	(g) Cleaves DNA
(viii) Large scale production of micro-organisms	(h) Genetic engineering

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Competition File Objective Type Question C Assertion Reason Type Questions

1. Assertion: Genetic engineering is essentially the alteration of the genetic make up of cells by deliberate and artificial means.

Reason: It involves transfer or replacement of genes to create recombinant DNA.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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2. Assertion : Genetic engineering is also called recombinant DNA technology.

Reason: It brings about improvement of genetic make up of an organism.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

3. Assertion : Insulin is a type of antibiotic.

Reason: It is synthesized by the process of fermentation.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: D

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4. Assertion : Antibodies have proved effective in lowering mortality rate.

Reason: Antibodies are used as preservation of food like fresh meat, fish and poultry feed.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation

of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B

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5. Assertion : DNA segments can be excised by 'molecular scissors or chemical scalpals' what biotechnologists call restriction enzymes.

Reason: Restriction enzymes are synthesized

by microbes as a defence mechanism are specific endonucleases which can cleave double stranded DNA.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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6. Assertion : Three main types of restriction endonucleases i.e., Type I, Type II and Type III are known with slightly different mode of action.

Reason: In palindromes with rotational symmetry second half of complementary

strand in DNA double helix is the mirror image of base sequence in the first half of another strand.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C

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7. Assertion : Recognition site should be perfectly single and responsive to commonly used restriction enzymes.

Reason: In pNR 322 Alien DNA is ligated generally in the area of Bam-HI site of tetracycline resistance gene.

A. If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C

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Chapter Practice Test Section A

1. Plasmids are suitable vectors for gene cloning because :

A. These are small circular DNA molecules which can integrate with host chromosomal DNA

B. These are small circular DNA molecules with their own replication origin site

C. These can shuttle between prokaryotic and eukaryotic cells

D. These often carry antibiotic resistance genes

Answer:

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2. Gel electrophoresis is used for

A. Construction of recombinant DNA by joining with cloning vectors

B. Isolation of DNA molecules

C. Cutting of DNA into fragments

D. Separation of DNA fragments to their size

Answer:

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3. Chemical knives of DNA are :

A. Endonucleases

B. Polymerases

C. Ligases

D. Transcriptase

Answer:

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4. Restriction endonucleases are called so as they

A. Restriction nuclear activity

B. Cleave DNA molecules into smaller pieces

C. Synthesize DNA

D. Breakdown DNA molecule at random

Answer:

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5. Enzyme that cuts DNA at specific sites is

A. DNA polymerase

B. DNA ligase

C. reverse transcriptase

D. Restriction endonuclease

Answer:

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6. A plasmid

A. Cannot replicate

B. Can replicate independently

C. Shows independent assortment

D. Lies together with chromosomes

Answer:

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1. What is rDNA?

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2. What is meant by gene cloning?

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3. What is cDNA library?

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4. Discuss the role of Berg (Biotechnologist) in the field of Genetic Engineering.

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5. Write any four ways used to introduce a desired DNA segment into a bacterial cell in recombinant technology experiments.

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Chapter Practice Test Section C

1. Retroviruses are disease causing microorganisms, even then are efficiently used in biotechnology experiments. Explain how is it possible.

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2. How does one visulaise DNA on an agarose gel?

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3. What are genetically modified organisms ?

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4. How restriction enzymes are used for removing sections of DNA from a chromosome?

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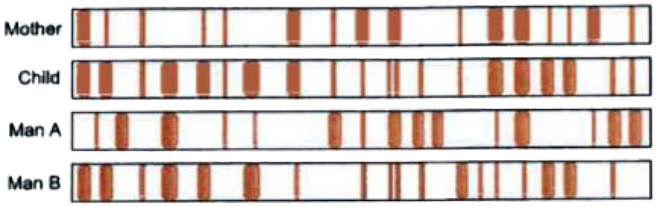
Chapter Practice Test Section D

1. In following DNA profile as proof of paternity, mention the conclusions drawn:



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Chapter Practice Test Section E

1. Describe the formation of recombinant DNA by the action of EcoRI.

OR

Describe the process of amplification of "gene of interest" usning PCR technique.

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2. Describe the tools of recombinant DNA technology.

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