CBSE Class12 Biology
Chapter 11 Unsolved Important Questions
Biotechnology: Principles and Processes

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Biotechnology: Principles and Processes

Section 'A'

Q. 1. How is the action of exonuclease different from that of endonuclease?

Q. 2. State the use of Biodiversity in modern agriculture.

Q. 3. Suggest a technique to a researcher who needs to separate fragments of DNA.

Q. 4. Why is the enzyme cellulase needed for isolating genetic material from plant cells and not from the animal cells?

Q. 5. Mention the type of host cells suitable for the gene guns to introduce an alien DNA.

Q. 6. Why is it not possible for an alien DNA to become part of a chromosome anywhere along its length and replicate normally?

Q. 7. Name the enzymes that are used for the isolation of DNA from bacterial and fungal cells for recombinant DNA technology.

Q. 8. How can bacterial DNA be released from the bacterial cell for biotechnology experiments?

Q. 9. Why is it not possible for an alien DNA to become part of a chromosome anywhere along its length and replicate normally?

Q. 10. Why is the enzyme cellulase needed for isolating genetic material from plant cells and not from the animal cells?

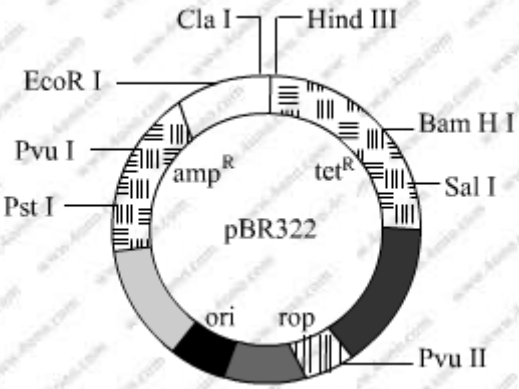
Q. 11. Why is the enzyme cellulose used for isolating genetic material from plant cells but not for animal cells?

Section 'B'

Q. 12. (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 responsible for controlling the copy number of the inserted gene.

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



Q. 13. (a) Name the source of Taq polymerase. Explain the advantage of its use in biotechnology.

(b) Expand the name of the enzyme ADA. Why is this enzyme essential in the body? Suggest a gene therapy for its deficiency.

Q.14. A recombinant DNA is formed when sticky ends of vector DNA and foreign DNA join. Explain how the sticky ends are formed and get joined.

Q.15. (i) Mention the number of primers required in each cycle of polymerase chain reaction (PCR). Write the role of primers and DNA polymerase in PCR

(ii) Give the characteristic feature and source organism of the DNA polymerase in PCR.

Q.16. Name and describe the technique that helps in separating the DNA fragments formed by the use of restriction endonuclease.

Q. 17. Explain with the help of a suitable example, the naming of a restriction Endonuclease.

Q.18. Name the source of the DNA polymerase used in PCR technique. Mention why it is used.

Q.19. Write any four ways used to introduce a desired DNA segment into a bacterial cell in recombinant technology experiments.

Q.20. (a) A recombinant vector with a gene of interest inserted within the gene of ∝ - galactosidase enzyme, is introduced into a bacterium. Explain the method that would help in selection of recombinant colonies from non-recombinant ones.

(b) Why is this method of selection referred to as "insertional inactivation?

Q.21. How can DNA segments, separated by gel electrophoresis be vistia1ised and isolated?

Q.22. Name the source of the DNA polymerase used in PCR technique. Mention why it is used.

Q.23. How are 'sticky ends' formed on a DNA strand? Why are they so called?

Q.24. Explain with the help of a suitable example, the naming of a restriction Endonuclease.

Q.25. What is genetic engineering List the steps in rDNA technology.

Q.26. State how has Agrobacterium tumifaciens been made a useful cloning vector to transfer DNA to plant cells.

Q.27. (a) Expand the following and mention one application of each:

(i) PCR (ii) ELISA

(b) (i) Mention the difference in the mode of action of exonuclease and endonuclease.

(ii) How does restriction endonuclease function?

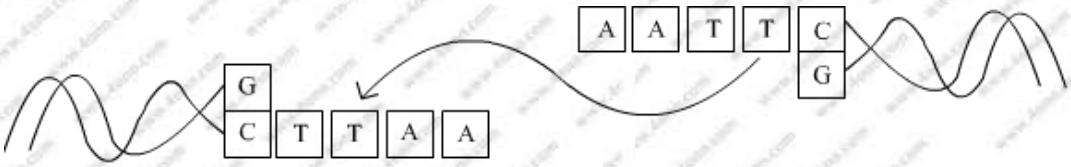
Q.28. Name two commonly used bioreactors. State the importance of using a bioreactor.

Q.29. Explain the work carried out by Cohen and Boyer that contributed immensely in biotechnology.

Q.30. List the key tools used in recombinant DNA technology.

Q.31. How is DNA isolated in purified form from a bacterial cell?

Q.32.



Study the linking of DNA fragments shown above.

(i) Name 'a' DNA and 'b' DNA.

(ii) Name the restriction enzyme that recognises this palindrome.

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

Q.33. What are recombinant protein? How do bioreactors help in their production?

Q.34. Explain the contribution of thermus aquaticus in the amplification of a gene of interest.

Section 'C'

Q. 35. 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 synthesized oligo-nucleotides

(c) Enzyme DNA-polymerase

(d) Complementary region of DNA

(e) Genomic DNA template

(f) Nucleotides provided

(g) Primers

(h) Thermostable DNA-polymerase (from Thermus aquaticus)

(i) Denaturation of ds-DNA

Q.36. (a) why must a cell made 'competent' in biotechnology experiments? How does calcium ion help in doing so?

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

Q.37. (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?

Q.38. How is the amplification of a gene sample of interest carried out using Polymerase Chain Reaction (PCR)?

Q.39. Why is Agrobacterium tumefaciens a good cloning vector? Explain.

Q.40. Suggest and describe a technique to obtain multiple copies of a gene of interest in vitro.

Q.41. What is a GMO? List any five possible advantages of a GMO to a farmer.

Q.42. Draw a labelled sketch of sparged-stirred-tank bioreactor. Write its application.

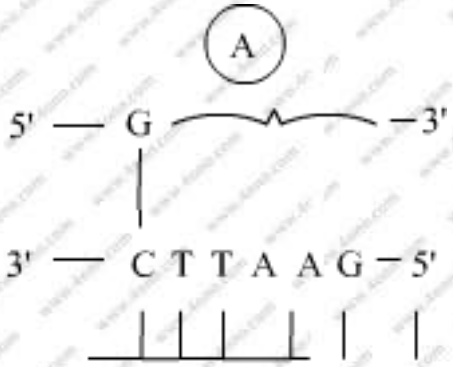
Q.43. Draw a schematic sketch of pBR 322 plasmid and label the following in it:

(a) Any two restriction sites.

(b) Ori and rop genes.

(c) An antierotic resistant gene.

Q.44. (a) Identify A and B illustration in the following:



(b) Write the term given to A and C and why?

(c) Expand PCR. Mention its importance in biotechnology.

Q.45. Eco RI is used to cut a segment of foreign DNA and that of a vector DNA to form a recombinant DNA. Show with the help of schematic diagrams.

(i) The set of palindronic nucleotide sequence of baes pairs the Eco RI will recognise in both the DNA segment. Mark the site at which Eco RI will act and cut both the segments.

(ii) Sticky ends of formed on both the segments where the two DNA segments will join later to form a recombinant DNA.

Q.46.

(a) Write your observation on the variations seen in the Darwin's finches shown above.

(b) How did Darwin explain the existence of, different varieties of finches on Galapagos Islands?

Q.47. Name and explain the techniques used in the separation and isolation of DNA fragments to be used in recombinant DNA technology.

Q.48. How and why is bacterium Themrus aquaticus employed in recombinant DNA technology? Explain.

Q.49. (a) What are 'molecular scissors'? Give one example.

(b) Explain their role in recombinant DNA technology.

Q.50. Explain the role(s) of the following in Biotechnology:

(a) Restriction endonuclease
(b) Gel − electrophoresis
(c) Selectable markers in pBR322.

Q.51. Write the steps you would suggest to be undertaken to obtain a foreign-gene-product.

Section 'D'

Q.52. (i) Describe the characteristics a cloning vector must possess.

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

Q.53. 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

Q.54. Name the source of Taq polymerase. Explain the advantage of its use in biotechnology.

Q.55. Expand the name of the enzyme ADA. Why is this enzyme essential in the body? Suggest a gene therapy for its deficiency.

Q.56. (a) Mention the role of vectors in recombinant DNA technology. Give any two examples.

(b)With the help of diagrammatic representation only, show the steps of recombinant DNA technology.

Q.57. (a) What is plasmid?

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

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