BIOLOGY

BOOKS - MBD

PRINCIPLES & PROCESSES IN BIOTECHNOLOGY

Example

1. Expand EFB.

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2. What is the contribution of Cohen and Boyer.

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3. What is plasmid?

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4. Write common name of restriction endonuclease?

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5. Name any two therapeutic products of DNA technology.

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6. What are molecular scissors? Explain their role.

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7. What are exonucleases?

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8. What are endonucleases?

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9. Name the scientists who were awarded Nobel Prize for discovery of enzyme EcoRI.

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10. What are pallindromes?

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11. Who developed the technique of electrophoresis and the principle on which it is based?

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12. A plasmid and a DNA sequence in a cell need to be cut for producing recombinant DNA. Name the enzyme which cts as a molecular scissors to cut the DNA segments.

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13. Expand the following :

PCR

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14. Expand the following :

Bt

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

(i) chemical nature

(ii) its duplication

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16. Name the bacterium that yields thermostable DNA polymerase.

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17. What is main function of gel electrophosis?

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18. Name two types of bioreactors. Who designed DNA amplification by PCR technique?

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19. What is the other name of gene gun method of tranfer of rDNA.

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20. Can you list 10 recombinant proteins which are used in medical practice? Find where they are used are therapeutics (use the internet).

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21. 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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22. Whatever you have learnt from class XI, can you tell whether enzymes are bigger or DNA is bigger in moleclar size?

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

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

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

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26. 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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27. From what you have learnt, can you tell whether enzyme are bigger or DNA Is bigger in molecular size? How did you know?

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28. Describe briefly "Origin of replication".

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29. Describe briefly Bioreactors.

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30. Describe briefly Downstream processing.

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31. Explain briefly the following

PCR

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32. Explain briefly the following

Restriction enzymes

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33. Explain briefly the following

Chitinase

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34. Discuss with your teacher and find mil how to distinguish between : Plasmid DNA and Chromosomal DMA

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35. Discuss with your teacher and find mil how to distinguish between : RNA and DNA

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36. Discuss with your teacher and find mil how to distinguish between : Exonuclcasc and Endonuclease

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

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38. Would you like to choose an exonuclease enzyme while produing a recombinant DNA molecule ?

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39. What does H, in , d and III refer in enzyme Hind -III?

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

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41. What does 'competent' refer to in component cells in transformation experiments?

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

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

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44. Name a recombinant vaccine that is currently being used in vaccination programme.

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45. Do biomolecules (DNA ,protein)exhibit biological activity in anhydrous conditions?

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46. What is meant by gene cloning?

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47. You have created a recombinant DNA molecules by ligating a gene to a plasmid vector. By mistake , your friend adds exonuclease enzyme to the tube containing the recombinant DNA. How will your experiment get affected as you plan to go tranformation now?

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48. The restriction enzymes that are used in construction of recombinant Dna molecule are endonucleases which cut the DNA at 'specific recognition sequence'. What would be the disadvantage if they would not cut the DNA at specific -recognition sequence?

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49. 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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50. How does one visualise DNA on agarose gel?

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

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52. A mixture of fragmented DNA was electrophoresed in an agarose gel. After staning the gel with ethidum bromide, no DNA

bands were observed. What could be the reason?

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

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54. What would happen when one grows a recombinant bacterium in a bioreactor but

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

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55. For selection of recombinants, insertional inactivation of antibiotic marker has been superseded by insertional inactivation of a marker gene coding for a chromogenic substrate. Give reasons.

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

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57. 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 continuous culture system.

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58. 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:

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

A. endonuclease

B. exonuclease

C. DNA ligase

D. Hind- II

Answer:

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60. The transfer to genetic material from one bacterium to another through the medication of a vector -like virus is termed as:

A. Transduction

B. Conjugation

C. Transformation

D. Translation

Answer:

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

A. a)DNA can be seen in visible light

B. b)DNA can be seen without staining in visible light

C. c)Ethidum bromide stained DNA can be seen in visible light

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

Answer:

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62. Restriction ' in Restrition enzyme refers to

A. Cleaving of phosphodiester bond in DNA by the enzyme

B. Cutting of DNAcan be seen in visible light

C. Prevention of the multiplication of bacteriophage in bacteria

D. All of the above

Answer:

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63. A recombinant DNA molecule can be produced in the absence of the following:

A. Restriction endonuclease

B. DNA ligase

C. DNA fragments

D. E. coli.

Answer:

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64. In agarose gel electrophoresis, DNA molecules are separated on the basis of their :

A. Charge only

B. Size only

C. Charge to size ratio

D. All of the above

Answer:

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65. The most important features in a plasmid to be used as a vector is:

A. Origin of replication (ori)

B. Presence of a selectable marker

C. Presence of sites for restriction endonuclease

D. Its size

Answer:

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66. While `isolating DNA from bcteria, which of the following enzymes is not used?

A. Lyozyme

B. Ribonuclease

C. Deoxyribonuclease

D. Protease

Answer:

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67. Which of the following has popularised the PCR ?

A. Easy availability of DNA template

B. Availability of synthetic primers

C. Availability of cheap deoxyribonucleotides

D. Avialability of 'Thermostable' DNA polymerase

Answer:

68. An antibiotic resistance gene in a vector usually help in the selection of :

A. Competent cells

B. Transformed cells

C. Recombinant cells

D. none of these

Answer:

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69. 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:

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70. The role of DNA ligae 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 off DNA fragments

C. Ligation of all purime and pyrimidine bases

D. none of these

Answer:

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

A. Haemophilus influenzae

B. Escherichia coli

C. Agrobacterium tumefaciens

D. Bacillius amyloli

Answer:

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

A. Denaturation of templete DNA

B. Annealing of primers to template DNA

C. Extension of primer end on the template DNA

D. All of the above

Answer:

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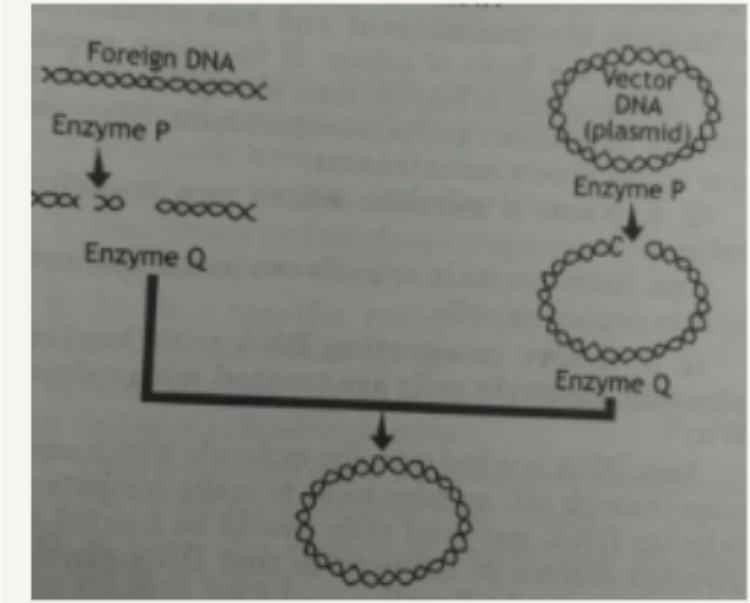
73. Name the enzymes 'P' and 'Q' that are involved in the processes given below.



A. Enzyme P-Exonuclease and Enzyme Q-permease

B. Enzyme P-Exonuclease and enzyme Q-Ligase

C. Enzyme P- endonuclease and Enzyme Q-Permease

D. Enzyme P-restriction endonuclease and Enzyme Q-Ligase

Answer:

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74. A biotechnologist wanted to create a colony of E.coli possessing the plasmid pBR322, sensitive to Tetracycline. Which one of

the following restriction sites would he use to ligate a foreign DNA?

A. Sal I

B. Pvu I

C. EcoRI

D. Hind III

Answer:

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75. Name the technique used to separate DNA fragments.

76. What is the principle of Gel electrophoresis?

77. What is the application of insertonal inactivation?

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78. Name a microbe which can transform cells.

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79. Before integrating DNA with bacterial plasmid, Bacteria cells are treated with

calcium.

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80. Give an example in which recombinant DNA technology has provided a board range tools in diagnosis of diseases.

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81. Give the full form of PCR. Who developed it?

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82. What is the source of DNA polymerase i.e. Taq polymerase?

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83. Define "melting of target DNA".

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84. How many PCR cycles are adequate for proper amplification of DNA segment?

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85. What can be the source of thermostable DNA?

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

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87. Name the enzymes that are used for isolation of DNA from bacterial and fungal cells for rDNA technology.

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88. What is EcoRI? How does EcoRI differ from an exonuclease?


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89. What are two core techniques that enabled birth of biotechnology?


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90. With the help of diagrams show the different steps in the formation of recombinant DNA by action of restriction endonuclease.

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91. List three important features necessary for preparing genetically modifying organism.

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92. What does EcoRI signify? How its name is derived?

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93. What are molecular scissors? Explain their role.

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94. Give the source of restriction enzyme , Bam HI and Kpn I.

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95. How are restriction endonuclease enzymers are named? Write Example.

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96. Explain any three methods of vectorless gene transfer.

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97. How does Agrobacterium acts as natural genetic engineer of plants ?

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98. Name the technique used for separation of DNA fragments. What is its principle ?

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99. How is DNA isolated in purified form?

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100. Define vector. Give the properties of a "Good Vector".

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101. What is the difference between clonig and expression vectors?

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102. Write a note on cloning vector.

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103. What do you understand by the term selectable marker?

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104. How has the development of bioreactor helped in biotechnology?

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105. name the most commonly used bioreactor and describe its working.

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106. What is PCR? List the three main steps . Show The steps with a diagrammatic sketch.

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107. Differentiate direct gene transfer and indirect gene transfer.

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108. Name the various cloning vectors and explain how a plasmid can be used for genetic engineering.

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109. How and why is the bacterium Thermus aquatics employed in recombinant DNA technology? Explain.

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110. Name the source of Taq polymerase. Explain its advantages.

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111. Differentiate gene therapy and gene cloning.

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112. What is the contribution of Cohen and Boyer.

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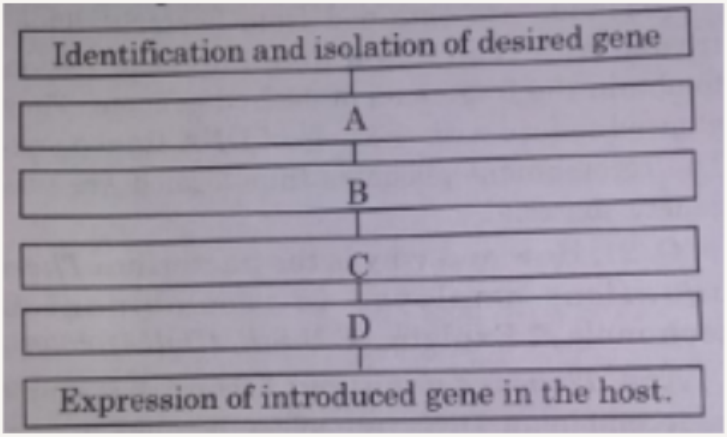
113. Steps involved in gene cloning are as follows: Complete the flow chart.



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114. With the help of simple sketch show the action of restriction enzyme.

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115. Make a skected to showing sites of cloning vector pBR 322.

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116. List the features required to facilitate cloning into vector. Show with a sketch the E. coli cloning vector showing restriction site.

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117. Explain the importance of

ori

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118. Explain the importance of

amp^R

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119. Explain the importance of

rop in the E.coli vector

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120. Name any two cloning vectors. Describe the feactures required to facilitate cloning into a vector.

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121. Name the most commonly used bioreactor. Why are these bioreacters used? How is the operation in a bioreactor carried out so as to achieve the desired end product?

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122. How is repetitive/ satellite DNA separated from bulk genomic DNA for various gentic experiments?

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

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124. How are 'Sticky ends' formed on a DNA strand? Why are these so called?

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125. Name the compound used for staining DNA to be used in Recombinant Technology. What is the color of such stained DNA?

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Exercise

1. Who among the following was awarded the Nobel Prize for the development of PCR technique?

A. Herbert Boyer

B. HarGobind Khorana

C. Kary Mullis

D. Arthur Kornberg

Answer: Arthur Kornberg

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2. Which of the following statement does not hold true for restriction enzyme?

A. it recognises a palindromic nucleotids sequence

B. It is an endonuclease

C. It is isolated from viruses

D. It produce the same kind of stickly ends in different DNA molecules.

Answer:

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3. Give one example of restriction endonuclease.

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4. How does one visualise DNA on agarose gel?

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5. What is the significance of adding proteases at the time of isolation of genetic material

(DNA) ?

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6. Differentiate BAC and YAC?

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7. What is meant by gene cloning?

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8. List the step involved in recombinant DNA technology.

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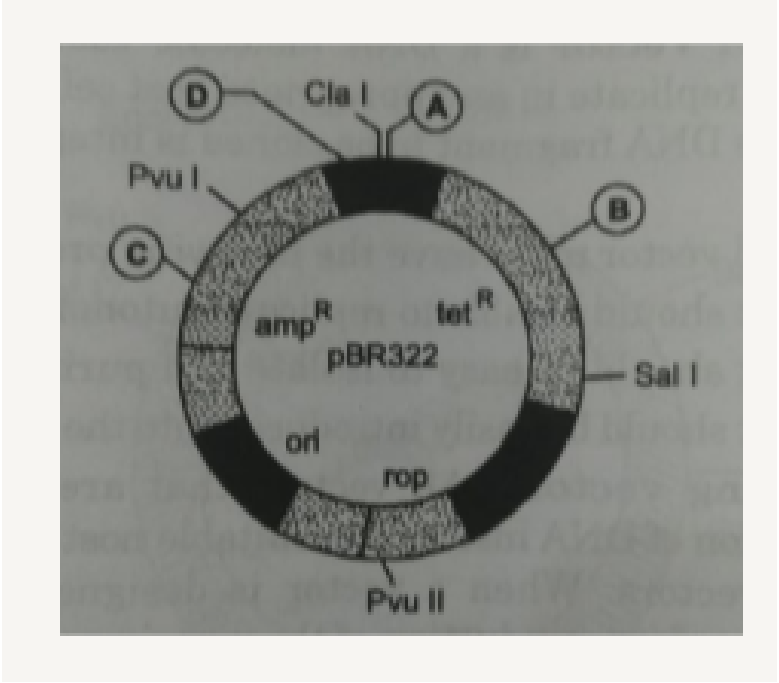
9. Redraw diagram of cloning vector pBR 322 given below and label the parts A, B , C, D

showing restriction sites.



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10. Polymerase chain reaction is useful in

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11. Draw sketch of simple stirred tank bioreactor.

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12. What is plasmid?

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

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14. Restriction endonucleases are useful in

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