



BIOLOGY

BOOKS - CHETANA PUBLICATION

BIOTECHNOLOGY

Example

1. What is biotechnology?



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2. Who was the first to use the term 'Biotechnology?'



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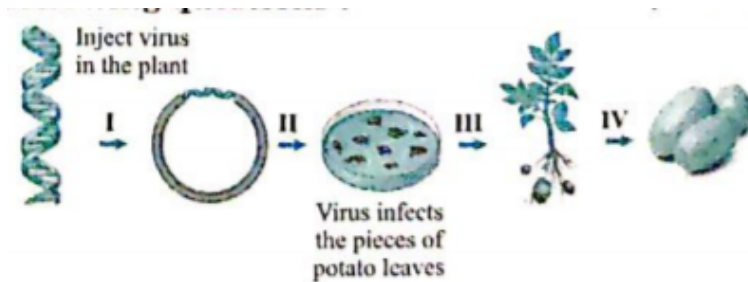
3. How are genetically modified organisms produced?



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4. Diagram/Chart-based questions:

Observe the figure and answer the following questions:



Write any two benefits of Biotechnology.



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5. Define Biotechnology.



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6. State the full form of OECD.



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7. Scientific principles of which fields are used in Biotechnology?



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8. Name some biological agents.



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9. State the two phases in the development of biotechnology.



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10. What is traditional biotechnology?



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11. Which new technique of Biotechnology was developed in 1970?



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12. Name the scientists who established the rDNA technology in 1973.



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13. State the 2 major features that differentiate modern biotechnology from classical/old biotechnology.



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14. Name some industries that now focus their attention to produce biotechnology based products.



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15. State the 2 core techniques that form the basis of modern biotechnology.



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16. What does genetic engineering deal with?



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17. What does chemical engineering deal with?



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18. Define genetic engineering.



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19. What is gene manipulation?



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20. Genetic engineering is alternatively called as Recombinant DNA technology or Gene

Cloning: Give scientific reason.



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21. State the process of new species formation according to Darwin.



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22. State the technique of gene cloning.



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23. Name the techniques used for gene cloning/rDNA technology on the basis of their molecular weight.



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24. Write note on electrophoresis.



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25. Who discovered PCR technique?



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26. Write a note on PCR technique.



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27. What are the requirements of PCR?



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28. Give the steps in PCR or polymerase chain reaction with suitable diagram.



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29. Name the biological tools for rDNA technology.



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30. Name the enzyme which cuts phosphodiester bonds of polynucleotide chains.



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31. State the role of endonucleases and exonucleases.



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32. Give an alternate term for restriction endonucleases.



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33. Restriction endonucleases are also called restriction enzymes'- give reason.



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34. Restriction endonucleases serve as defence mechanism' give reason.



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35. Why are restriction enzymes also called 'molecular scissors'?



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36. Why are restriction enzymes also called 'molecular scissors'?



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37. What is a palindrome? Illustrate it.



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38. How do restriction enzymes cut palindromes?



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39. What are cloning vectors?



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40. Which are the most commonly used vectors for cloning?



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41. Name any two plasmid vectors.



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42. Name two bacteriophages used as vectors.



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43. Explain the characteristics of a good vector.



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44. Which is the most commonly used constructed plasmid for rDNA technology in plants?



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45. Which is the most commonly used constructed plasmid for rDNA technology in plants?



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46. Sketch and label plasmid cloning vector showing replication origin, a drug resistant gene and a region in which the foreign DNA can be inserted.



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47. Name the bacterium causing crown gall.



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48. Write a note on Ti-Plasmid.



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49. Name any 2 competent hosts.



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50. Give the role of Ca^{+2} ions in the transfer of recombinant vector into bacterial host cell.



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51. Explain the properties of a good or ideal cloning vector in rDNA technology.



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52. A PCR machine can raise temperature upto $100^{\circ}C$ but after that it is not able to lower the temperature below $70^{\circ}C$ automatically.

Which step of PCR will be hampered first in this faulty machine explain why?





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53. Enlist different types of restriction enzymes commonly used in rDNA technology.

Write their role.



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54. Name the biological tools for rDNA technology.



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55. In the process of rDNA technology, if two separate restriction renzymes are used to cut vector and donor DNA then which problem will arise in the formation of rDNA or chimeric DNA. Explain.



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56. Explain in steps in the process of rDNA technology with suitable diagrams.



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57. Explain briefly the role of health care biotechnology.



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58. Where is insulin produced?



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59. Which peptide hormone was discovered by Sir Edward Sharpey-Schafer?



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60. State the role of insulin



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61. Name the disease in which human beings cannot make insulin themselves.



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62. Who synthesized DNA sequence of insulin.



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63. Name the vector which is used in the production of human insulin through rDNA technology.



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64. Which cells from Langerhans of pancreas produce a peptide hormone insulin?



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65. What is a vaccine? Give advantages of oral vaccines or edible vaccines.



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66. What is the role of tissue culture?





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67. What is Gene therapy?



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68. Name any 2 disease have genetic factor as the caused of the disease.



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69. Name any genetically caused diseases.



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70. Enlist the role/uses of gene therapy.



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71. vaccines activate the



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72. Explain the types of gene therapy.



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73. Differentiate between Germ-line gene therapy and somatic gene therapy.



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74. What are Genetically Modified Organisms?



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75. What are the advantages of GMO's?



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76. Which was the first transgenic plant produced?



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77. Name a transgenic food crop used to reduce vitamin-A deficiency.



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78. Which genes are found in Insect-resistant GM plants?



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79. Where is 'cry gene' isolated from?



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80. State the role of 'cry gene'.



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81. To produce Bt cotton, the gene responsible for toxin production is isolated from *Bacillus thuringiensis* and integrated with the gene of the cotton plant.



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82. State the role of transgenic plants.



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83. Flavor savr tomatoes have a longer shelf life-give reasons.



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84. What are biopharmaceuticals?





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85. Name some proteins produced by transgenic crop plants.



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86. State some novel products of transgenic origin with commercial applications.



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87. What are transgenic animals? How are they created?



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88. Enlist the applications/uses of transgenic animals.



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89. How are transgenic mice used in cancer research?



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90. What are the main objectives for improved animal breeding programmes coupled with gene transfer technology?



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91. Which proteins increase milk production in transgenic cattle?



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92. Which gland in dairy cows is considered as an excellent protein production factory?



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93. Which protein can be abundantly obtained from a transgenic cow to treat haemophilia?



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94. State the applications of antibodies obtained from transgenic cattle.



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95. Name the genes introduced from bacteria into transgenic sheep that increase wool production and improve the quality of wool.



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96. State the role of 'cys E' and 'cys M'.



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97. Pigs are the most suitable animals to be bred for heart transplant'. Explain with reasons.



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98. What is Xenotransplantation?



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99. Which technical term is used to describe the process wherein animal organs and tissues are used for human transplants?



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100. How are cancer patients are treated?



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101. Which characteristics are observed in transgenic fish?



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102. Which factors affect the economic value of fish?



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103. Enlist the characteristics of transgenic chicken.



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104. Define Bioethics.



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105. What is bio-ethics?



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106. How have GMOs affected Bio ethics?



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107. What is the role of 'Round Up'?



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108. Which transgenic crop has an adverse effect on Monarch butterfly population?



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109. What are the main areas of biotechnology?



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110. Explain in detail the importance of biotechnology in human health.



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111. State the full form of acronym GEAC.



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112. State the role of GEAC.



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113. What is a patent?



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114. Write a note on Biopatent.



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115. Which was the first bio-patent? State its role.



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116. Define Biopiracy.



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117. Explain Bio-piracy giving suitable examples.



Watch Video Solution

118. Define Biopatent.



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119. Match the columns.

A Restriction Enzyme	B (Organism and strain)
(i) Alu I	(a) H influenzae Rd
(ii) Bam H I	(b) Escherichia coli Ry 13
(iii) Eco R I	(c) Arthobacter luteus
(iv) Hind II	(d) Bacillus amyoliquefaciens H



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120. Match and write pairs.

'A' Disorder/Disease Health condition	'B' Recombinant Protein
(i) Anaemia	(a) Hepatitis B vaccine
(ii) Asthma	(b) TPA urkinase
(iii) Blood clots	(c) Interleukin receptor
(iv) Cancer	(d) Factor IX
(v) Haemophilia B	(e) Erythropoieten
(vi) Hepatitis B	(f) Interferons, tumour necrosis factor interleukins



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121. Match the columns.

A Substance	B Crop
(i) Pro Vitamin A+ Iron	(a) Tomato
(ii) Vitamin E	(b) Sugarbeet
(iii) Flavonoids	(c) Rice
(iv) Fructants	(d) Canola



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122. Complete the table.

	Substance	Crop	Transgene
(i)	A	Rice	Feritan, phytase, metallothioein
(ii)	B	Tomato	D
(iii)	Vitamin E	C	r-tocopherol methyl transferase

Ans. A - Iron; B - Flavonoids; C - Canola; D - Chitinase



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123. Expand the acronyms which are used in the field of protechnology.



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124. FIB and Complete chart.

	GMO	Purpose
(i)	Bt Cotton	B
(ii)	A	Delay the softening of tomato during ripening
(iii)	Golden rice	C
(iv)	Holstein cow	D



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Exercise

1. Choose the correct option: The bacterium which causes a plant disease called crown gall is _____

- A. *Helicobacter pylori*
- B. *Agrobacterium tumefaciens*
- C. *Thermophilus aquaticus*
- D. *Bacillus thuringiensis*

Answer:



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2. The enzyme nuclease hydrolyses _____ of polynucleotide chain of DNA.

- A. Hydrogen bonds
- B. Phosphodiester bonds
- C. glycosidic bonds
- D. peptide bonds

Answer:



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3. In vitro amplification of DNA or RNA segment is known as _____

- A. Chromatography
- B. Southern blotting
- C. polymerase chain reaction
- D. gel electrophoresis

Answer:



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4. Which of the following is the correct recognition sequence of restriction enzyme Hind III

A. 5'-A-A-G-C-T-T-3' 3'T-T-C-G-A-A-5'

B. 5'-A-A-T-T-C-3' 3'C-T-T-A-A-G-5'

C. 5'-C-B-A-T-T-C-3' 3'G-C-T-A-A-G-5'

D. 5'-G-G-C-C-3' 3'-C-C-G-G-5'

Answer:



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5. Recombinant protein _____ is used to dissolve blood clots present in body.

A. insulin

B. tissue plasminogen activator

C. relaxin

D. erythropoietin

Answer:



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6. Recognition sequence of restriction enzymes are generally _____ nucleotide long.

A. 2-4'

B. 4-8'

C. 8-10'

D. 14-18'

Answer:



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7. In vitro cloning can be done via _____

- A. jumping genes
- B. polymerase chain reaction
- C. gel electrophoresis
- D. Lambda phage

Answer:



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8. The molecular scissors/knives of DNA are

A. polymerases

B. transcriptases

C. Endonucleases

D. ligases

Answer:



9. Bacteriophage M13 has _____

- A. ss RNA
- B. ds RNA
- C. ds DNA
- D. ss DNA

Answer:



10. PCR technique was developed by _____

A. Peter Labbon

B. K. Mullis

C. Stanley Cohen

D. Herbert Boyer

Answer:



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11. Thermostable DNA polymerase can withstand temperature up to _____

A. $100^{\circ} C$

B. $240^{\circ} C$

C. $112^{\circ} C$

D. $94^{\circ} C$

Answer:



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12. The molecular scissors/knives of DNA are

A. restriction endonuclease

B. gyrase

C. DNA ligase

D. helicase

Answer:



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13. The enzyme affecting the shelf life of Flavr
savr tomato is _____

A. galactosidase

B. transacetylase

C. permease

D. polygalacturonase

Answer:



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14. In nomenclature for RENS Hind III, III stands for _____

A. genus name

B. species

C. order of discovery

D. strain of the organism

Answer:



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15. Transfer of genetic material into a bacterial cell through a viral vector is known as _____

A. transformation

B. transduction

C. transfection

D. translation

Answer:



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16. The molecular scissors/knives of DNA are

A. Restriction endonucleases

B. DNA ligases

C. DNA polymerases

D. Reverse transcriptases

Answer:



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17. What is the correct sequence of stages in the bacteriophage lytic cycle?

A. Attachment, Penetration, Lysis,

Multiplication

B. Attachment, Penetration, Multiplication,

Lysis

C. Lysis, Penetratin, Multiplication,

Attachement

D. Attachement, Lysis, Multiplication,
Penetration

Answer:



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18. Cry gene' is present in _____

A. *Agrobacterium tumifaciens*

B. *Bacillus thuringiensis*

C. *Rhizobium* sps

D. E. coli

Answer:



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19. DNA fragments result when _____ cut DNA molecules at specific sites.

A. RFLP's

B. DNA probes

C. restriction enzymes

D. DNA polymerase

Answer:



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20. Match column:

A Recombinant Protein	B Disorder/ Disease Health condition
(i) Relaxin	(a) Haemophilia A
(ii) Erythropoietin	(b) cystic fibrosis
(iii) DNA ase	(c) Parturition
(iv) Factor VIII	(d) Anaemia



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21. In rDNA technology, a plasmid vector must be cleaved by_____

A. the same gene that cleaves the donor gene

B. modified DNA ligase

C. a heated alkaline solution

D. four separate enzymes

Answer:



22. A _____ is a multiple, identical copies of a collection of DNA fragments inserted into plasmids.

- A. DNA clone
- B. DNA probes
- C. gene map
- D. DNA library

Answer:



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23. _____ is a transfer of normal genes into body cells to correct a genetic defect?

- A. Germ line gene therapy
- B. Somatic gene therapy
- C. gene therapy
- D. gene mutation

Answer:



24. Which tool of rDNA technology is incorrectly paired with its use?

A. Reverse transcriptase - production of cDNA from mRNA

B. DNA polymerase - used in PCR to amplify section of DNA

C. DNA ligase - enzyme that cuts DNA, creating the sticky end the restricting

fragments

D. Restriction enzymes - production of RFLP

Answer:



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25. Plants are easily manipulated by genetic engineering more than animals because _____

- A. recombinant genes can be inserted into plant cells by microinjection
- B. a somatic cell can grow into a new plant
- C. more vectors are available to transfer rDNA into plant cells
- D. plant cells do not contain introns

Answer:



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26. Which of the following sequences along a double stranded DNA may be recognized as a cutting site for a particular restriction enzyme.

A. AAGG TTCC

B. AGTC TCAG

C. GGCC CCGG

D. ACCA TGGT

Answer:



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27. In rDNA technology, the term vector refers to _____

- A. a DNA probe used to locate a particular gene
- B. a plasmid or other agent that transfers DNA into a living cell
- C. enzyme that cuts DNA into fragments
- D. sticky end' of DNA fragment

Answer:





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28. The template used to make cDNA is _____

A. restriction fragment

B. DNA probes

C. plasmid

D. mRNA

Answer:



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29. What is the function of DNA ligase in rDNA technology?

A. Cut DNA into many fragments

B. carry DNA into new cell

C. Link together newly joined fragments of
DNA

D. Separate fragments of DNA by their
length and electric charges

Answer:





30. Pick out the function of a vector in genetic engineering.

A. cut DNA into many fragments

B. carry DNA into a new cell

C. link together newly joined fragments of

DNA

D. make millions of copies of a specific

segment of DNA

Answer:



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31. The function of PCR technique is _____

- A. Cut DNA into many fragments
- B. carry DNA into new cell
- C. Link newly joined DNA fragementts
- D. Make millions of copies of a specific
segment of DNA

Answer:



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32. Who was awarded the Nobel Prize for the development of PCR technique?

A. Kary Mullis

B. Herbert Boyer

C. J.D. Watson

D. F.H.C. Crick

Answer:



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33. Which of the following is not a source of restriction endonuclease.

A. *E. coli*

B. *Haemophilus influenzae*

C. *Bacillus amyloliquefaciens*

D. *Entamoeba histolytica*

Answer:



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34. C-peptide of human insulin is _____

A. responsible for its biological activity

B. removed during maturation of pro-insulin to insulin

C. a part of mature insulin molecule

D. responsible for formation of disulphide
bridges

Answer:



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35. Which enzymes catalyze the removal of nucleotides from the ends of DNA?

A. Exonuclease

B. DNA ligase

C. Endonuclease

D. Hindi II

Answer:



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36. Which of the following amines does not undergo acetylation?

A. Insertion of gene for bovine growth
normone

B. alteration of lymphocytes to contain an enzyme for the maturation of T and B cells

C. alteration of bone marrow stem cells to allow synthesis of production in all kinds of blood cells

D. use of reverse transcriptase to move rDNA into the chromosome

Answer:



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37. Plants are expected to be genetically engineered to have _____

- A. a requirement for more fertilizer
- B. an increased requirement for water
- C. increased susceptibility to herbicides
- D. the ability to produce all amino acids

Answer:



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38. Which medical application of rDNA technology has not yet been attempted?

A. Genetic testing for carriers of harmful alleles

B. Prenatal identification for genetic disease

C. introduction of genetically engineered genes into human germ cells

D. Production of hormones to treat diabetes and dwarfism

Answer:



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39. Arapdiopsis genes are associated with

A. Improved Vit A content

B. Improvement of oil content and quality

C. Improved Vit E content

D. Improved Iron content

Answer:



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40. α amylase inhibitor (α -AI Pv) has been isolated from _____

A. Sarghum vulgare

B. Phaseolus vulgaris

C. *Zea mays*

D. *Triticum aestivum*

Answer:



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41. Transgene chalcone isomerase is associated with the following nutraceutical in Tomato

A. Flavonoids

B. Pro-vitamin A

C. Vitamin E

D. Iron

Answer:



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42. _____ causes cold sores.

A. Respiratory syncytial virus

B. HIV

C. Herpes simplex virus

D. Corona virus

Answer:



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43. 'Myc' and 'Ras' are _____

A. oncogenes

B. transgenes

C. vectors

D. clones

Answer:



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44. Tracy was a transgenic animal, who produced _____

A. human protein in her milk for human

therapeutics

B. oncogenes

C. beta casein and kappa casein

D. better wool and meat

Answer:



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45. cys E' and 'cys M' genes are concerned with

A. formation of keratin protein found in
wool

B. xenotransplantation

C. improving quality and quantity of fish proteins

D. higher protein content in eggs

Answer:



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46. E. coli hygromycin resistance gene is used in _____

A. transgenic pigs

B. transgenic

C. transgenic fish

D. transgenic cattle

Answer:



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47. Production of higher content of _____
caused allergic reactions in 'Biotech soya
beans'

A. Valin

B. Methionine

C. Aspartic acid

D. Leucine

Answer:



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48. Bt corn has adverse effects on _____

A. Zebra swallowtail butterfly populations

B. Red admiral butterfly populations

C. Monarch butterfly populations

D. Milberts tortoise shell butterfly
populations

Answer:



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49. Subjective matter of invention is termed as

A. grant

B. Claim

C. Patent

D. specification

Answer:



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50. USDA and W.R. Grace were involved with patenting of _____

A. Basmati

B. Neem

C. Turmeric

D. Rice

Answer:



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51. USPTO granted the patent for _____

A. Basmati rice lines and grains

B. Turmeric

C. Neem

D. Basmati rice

Answer:



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52. Xenotransplantation is possible so far with

A. transgenic mice

B. transgenic pigs

C. transgenic cattle

D. transgenic sheep

Answer:



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53. Crystal of Bt toxin produced by some bacteria do not kill the bacteria themselves because _____

A. bacteria are resistant to the toxin

B. toxin is immature

C. toxin is inactive

D. bacteria encloses toxin in a special sac

Answer:



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54. Taq polymerase is used in _____

A. PCR

B. DNA fingerprinting

C. Gene cloning

D. Artificial replication

Answer:



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55. In plasmid pUC, UC stands for _____

A. University of California

B. Universal cod

C. University of Chicago

D. Universal codon

Answer:



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56. The template used to make cDNA is _____

A. DNA probe

B. restriction fragment

C. plasmid

D. m RNA

Answer:



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57. Recombinant protein Relaxin is associated with the following health condition _____

A. Cystic fibrosis

B. Parturition

C. Anaemia

D. Haemophilia A

Answer:



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58. Arapdiopsis genes are associated with

A. Improved Vit A content

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C. Improved Vit E content

D. Improved Iron content

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60. Recombinant protein _____ is used to dissolve blood clots present in body.

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