



BIOLOGY

BOOKS - TRUEMAN'S BIOLOGY

(ENGLISH)

BIOTECHNOLOGY : PRINCIPLES AND PROCESSES

Multiple Choice Questions

1. Biotechnology utilizes new organisms developed from present organisms utilizing

A. mutations

B. recombinant DNA technology

C. both (1) and (2) correct

D. none of these

Answer: C



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2. Which of the following organelles is related to genetic engineering? (A) Plastids (B) Plasmids (C) Mutations (D) Hybrid vigour

A. Plaastids

B. Plasmids

C. Mutations

D. Hybrid vigour

Answer: B



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3. Genetic engineering is possible because

A. the phenomenon of transduction in

bacteria is well understood

B. restriction endonuclease purified from

bacteria can be used in vitro

C. we can cut DNA at specific sites by

endonuclease like DNAase I

D. we can see DNA by electron microscope

Answer: B





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4. Two bacteria found to be very useful in genetic engineering experiments are

- A. Nitrosomonas and Klebsiella
- B. Nitrobacter and Azotobacter
- C. Rhizobium and Diplococcus
- D. Escherichia and Agrobacterium

Answer: D



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5. Noble prize of 1978 for restriction endonuclease technology was given to :

A. Temin and Baltimore

B. Milstein and Kohler

C. Arber, Nathans and Smith

D. Holley, Khorana and Nirenberg

Answer: C



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6. Which of the following scientists won the Nobel Prize for the development of polymerase chain reaction (PCR) in the year 1993?

- A. Cesar Milstein
- B. Philip Sharp
- C. Susumu Tonegawa
- D. Kary Mullis

Answer: D



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7. The polymerase chain reaction (PCR) is a powerful technique

A. mutase genes

B. amplify genes

C. inhibit DNA synthesis

D. induce protein synthesis

Answer: B



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8. Advancement in genetic engineering has been possible due to :

A. oncogenes

B. exonucleases

C. transposons

D. endonucleases

Answer: D



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9. What is true of plasmids?

- A. They are found in viruses
- B. They are main parts of chromosomes
- C. They are widely used in gene transfer
- D. They contain genes for vital activities

Answer: C



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10. Genetic engineering would not have been possible if one of these were absent

A. DNA polymerase

B. Reverse transcriptase

C. DNA ligase

D. RNA synthetase

Answer: C



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11. Artificial synthesis of DNA done by

A. Wilkinson

B. Kornberg

C. Franklin

D. Watson & Crick

Answer: B



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12. In the process of recombinant DNA technology, the isolated foreign DNA is inserted into another DNA molecule known as

- A. DNA vector
- B. RNA vector
- C. protein vector
- D. cloning vector

Answer: D



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13. The technique for breakage of DNA fragment and inserting it into another DNA molecule, is related to

- A. gene splicing
- B. gene cloning
- C. gene typing
- D. DNA finger printing

Answer: B



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14. Extrachromosomal self replicating double stranded circular DNA in bacterial cell is called

A. plasmid

B. cosmid

C. phasmid

D. all of these

Answer: D



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15. The first successfully cloned mammal (animal) that gained worldwide publicity was

A. Molly (a sheep)

B. Polly (a sheep)

C. Chance (a bull)

D. Dolly (a sheep)

Answer: D



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16. Ligase helps in

A. removal of few genes

B. translation

C. inserting few genes in DNA

D. bringing transversion in chromosomes

Answer: C



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17. Construction of a recombinant, DNA involves (A) cleaving of a recombinant DNA involves with 'endonuclease' alone (B) cleaving DNA segments with 'endonuclease' and rejoining them with 'ligase' (C) cleaving DNA segments with 'ligase' and rejoining them with 'endonuclease' (D) cleaving and rejoining DNA segments with 'ligase' alone

A. cleaving of a recombinant DNA involves with 'endonuclease' alone

- B. cleaving DNA segments with 'endonuclease' and rejoining them with 'ligase'
- C. cleaving DNA segments with 'ligase' and rejoining them with 'endonuclease'
- D. cleaving and rejoining DNA segments with 'ligase' alone

Answer: B



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18. Who is regarded as 'father of Genetic engineering'? (A) Cohen (B) Boyer (C) Berg (D) Smith

A. Cohen

B. Boyer

C. Berg

D. Smith

Answer: C



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19. The term biotechnology was given in 1919 by (A) Arber (B) Nathans (C) Karl Ereky (D) Kornberg

A. Arber

B. Nathans

C. Karl Ereky

D. Kornberg

Answer: C



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20. Cutting of DNA at specific location by restriction enzymes is popularly called "molecular scissors". The cut piece of DNA is linked with the plasmid DNA called

- A. (a) reactor
- B. (b) vector
- C. (c) inverter
- D. (d) protractor

Answer: B



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21. How many types of restriction endonucleases are present ?

A. Two types

B. Three types

C. Four types

D. Five types

Answer: C



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22. which type of restriction enzymes are used in recombinant DNA technology?

A. Type - I

B. Type II

C. Type -III

D. All of the above

Answer: B



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23. The first restriction endonuclease was:

A. EcoRII

B. Hin d-II

C. Hin d-III

D. Ava I

Answer: B



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24. Who is the father of biotechnology in India ? (A) Prof. V.L. Chopra (B) Dr. Lalji Singh (C) E.J. Butler (D) S.C. Maheshwari

A. Prof of V.L. Chopra

B. Dr. Lalji Singh

C. E.J. Butler

D. S.C. Maheshwari

Answer: A



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25. Taq polymerase enzyme is used in

A. restriction mapping

B. gene cloning

C. PCR

D. all of these

Answer: C



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26. Which of the following is a method of gene transfer ?

A. Microinjection

B. gene gun

C. Electroporation

D. All of these

Answer: D



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27. 'Lal Bahadur Shastri centre for Advanced Research in Biotechnology" is situated at

A. Delhi

B. Mumbai

C. Bangalore

D. Chandigarh

Answer: A



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28. A gene carried by recombinant DNA is cloned when

A. its host bacterium divides by binary

fission

B. it is transcribed

C. it is fragmented by restriction enzymes

D. it is hybridized

Answer: A



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29. In recombinant DNA technology, a plasmid vector is cleaved by

A. four separate enzymes

B. modified DNA ligase

C. a heated alkaline solution

D. the same enzyme that cleaves the donor genes

Answer: D



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30. Becoming an expert on gel electrophoresis, you are asked to examine a gel for a colleague. Where would you find the smallest segments of DNA ?

A. Near the positive electrode, farthest away from the wells

B. Near the negative electrode, close to the wells.

C. Near the top, near the negative pole.

D. Near the middle, they tend to slow down after the first few minutes.

Answer: A



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31. Plasmids are used in genetic engineering because they are

A. easily available

B. able to replicate

C. able to integrate

D. inert

Answer: B



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32. Cloning is means to

A. replace original genotype

B. preserve genotype

C. production of high degree in Escherichia coli

D. none of the above.

Answer: B



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33. The palindromes are groups of letters that form thewhen read in both direction forward and backward

A. different words

B. same words

C. alternative words

D. both (1) and (2)

Answer: B



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34. Which of the following is a restriction endonuclease?

A. Lipase

B. Amylase

C. Alul

D. Anhydrase

Answer: C



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35. Alkaline phosphatase can be isolated from

A. (a) bacteria

B. (b) calf intestine

C. (c) cat intestine

D. (d) both (a) and (b)

Answer: D



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36. The DNA polymerase was investigated by

A. (a) Boliver and Rodriguez

B. (b) Korenberg

C. (c) Stanley Cohen and Herbert Boyer

D. (d) Bert

Answer: B



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37. Separation and isolation of DNA fragments can be done by a technique called gel electrophoresis. This technique was developed by :

A. Chamberlain

B. Karl Mullis

C. Tiselius

D. Nathans

Answer: C



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38. The first artificial cloning vector was

A. pBR322

B. M13

C. phagemid vectors

D. cosmid Vectors

Answer: A



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39. Which one of the following bacteria has found extensive use in genetic engineering work in plants?

A. Clostridium species

B. Xanthomonas citri

C. Bacillus coagulants

D. Agrobacterium tumefaciens

Answer: D



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40. Polymerase chain reaction is most useful in

A. DNA synthesis

B. DNA amplication

C. Protein synthesis

D. Aminoacid synthesis

Answer: B



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41. Crown gall disease in plants is caused by :

A. Ti plasmid

B. Pi plasmid

C. Bacteria

D. Virus

Answer: A



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42. The tumour inducing capacity of *Agrobacterium tumefaciens* is located in large extrachromosomal plasmids called :

A. Ri plasmid

B. lambda phage

C. pBR 322

D. Ti plasmid

Answer: D



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43. At which stage of meiosis, recombinant DNA is made?

A. Zygotene

B. Diplotene

C. Metaphase-I

D. Pachytene

Answer: D



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44. Large scale production of biotechnological products involves use of

A. bioreactor/fermenter

B. electrophoresis

C. RFLP

D. PCR

Answer: A



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45. The specific DNA sequence where EcoRI cuts is

A. GATTCG

B. GAATTC

C. GTTCAA

D. TTCCAA

Answer: B



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46. Cryopreservation is done at temperature

A. $-140^{\circ}C$

B. $-196^{\circ}C$

C. $-120^{\circ}C$

D. $-180^{\circ}C$

Answer: B



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47. First step in genetic engineering is

A. isolation of RNA

B. isolation of protein

C. isolation of genetic material

D. purification of protein

Answer: C



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48. Restriction enzymes are isolated chiefly from

A. Prokaryotes

B. protists

C. protozoans

D. fungi

Answer: A



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49. Which of the following recent techniques is used for separating fragments of DNA ?

A. northern blotting

B. southern blotting

C. eastern blotting

D. western blotting

Answer: B



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50. Synthetic seeds are

A. chemical seed

B. encapsulated somatic embryos

C. clone

D. none above

Answer: B



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51. ELISA test is used to

- A. separate viral RNA
- B. purify proteins
- C. isolate DNA
- D. identify specific proteins

Answer: D



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52. The enzymes used for separating the cells for protoplast culture are

- A. cellulase and pectinase
- B. protease and lipase
- C. gyrase and helicase
- D. endonuclease and ligase

Answer: A



53. The vectorless gene transfer includes

- A. Particle gun
- B. microinjection
- C. electroporation
- D. all the above

Answer: D



54. Electrophoresis and Southern blotting techniques are used in

- A. DNA fingerprinting
- B. Gene synthesis
- C. Gene cloning
- D. All of these

Answer: A



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55. In plasmid pBR 322, 'BR' stands for

A. experiment number

B. plasmid number

C. name of scientists

D. name of animal

Answer: C



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56. Restriction endonuclease cuts

A. ds-DNA

B. ss-DNA

C. single strand of ds-DNA

D. both (2) and (3)

Answer: A



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57. Who first discovered the restriction endonuclease?

A. Smith

B. Jacob

C. Lwoff

D. Hounsfield

Answer: A



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58. Restriction endonucleases (Molecular Scissors) are utilised in genetic engineering technique as

A. molecular build up nucleotides in tandem

B. molecular scalpels for cutting DNA break up

C. molecular scalpels for cutting DNA at specific sites

D. molecular cement for combining DNA bits into long chains

Answer: C



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59. First restriction enzyme was isolated from

A. *E. coli*

B. *Haemophilus influenzae*

C. *Pseudomonas*

D. *Xanthomonas*

Answer: B



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60. Who first reported of restriction enzyme in bacterial cells?

A. Arber

B. Laderberg

C. Smith

D. Sanger

Answer: A



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61. Genetic engineering is :

A. Plastic surgery

B. Addition or removal of genes

C. Study of extranuclear genes

D. All the above

Answer: C



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62. Foreign DNA is also called

A. vehicle DNA

B. passenger DNA

C. r-DNA

D. Vector DNA

Answer: B



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63. In Rous Sarcoma Virus (RSV), flow of information is

A. DNA \rightarrow RNA \rightarrow Proteins

B. RNA \rightarrow RNA \rightarrow Proteins

C. RNA \rightarrow DNA \rightarrow RNA \rightarrow Proteins

D. RNA \rightarrow DNA \rightarrow Proteins

Answer: C



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64. Best cloning organism for genetic engineering and biotechnology is

A. Agrobacterium

B. Pseudomonas

C. E. coli

D. Lambda phage

Answer: C



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65. Bioreactor is a vessel/device in which

A. atomic reactor

B. large vessel to grow cells

C. BOD incubator

D. COD incubator

Answer: C



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66. The technique in which foreign DNA is precipitated over surface of metal particles for passing into target cells is

A. microinjection

B. chemical-mediated gene transfer

C. particle gun

D. electroporation

Answer: C



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67. T_m represents

- A. temperature of evaporation
- B. evaporation of essential oil
- C. temperature of DNA denaturation
- D. trade-mark of products

Answer: C



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68. Molecular markers are

- A. Phenotypic trait in a crop
- B. differences in essential oil content
- C. molecular marks on a plant
- D. parameters of molecular biology

Answer: D



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69. The process of reverse transcription was brought to light by the work of :

A. Geroge Bendic and Edward Tatum

B. Garrod

C. H.W - Temin and D.Baltimore

D. R.W. Holy and Grover

Answer: C



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70. Who discovered recombinant DNA (rDNA) technology?

A. Har Gobind Khurana

B. James D Watson

C. Stanley Cohen and Herbert Boyer

D. Walter Sutton and Avery

Answer: C



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71. One of the key factors, which makes the plasmid the vector in genetic engineering is

- A. It is resistant to antibiotics
- B. It is resistant to restriction enzymes
- C. Its ability to carry a foreign gene
- D. Its ability to cause infection in the host

Answer: C



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72. 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: B



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73. Chemical knives of DNA are :

A. endonuclease

B. Polymerase

C. ligase

D. transcriptase

Answer: A



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74. Gel electrophoresis is used for

A. construction of r-DNA

B. isolation of DNA

C. cutting of DNA

D. separation of DNA fragments according to their size or length

Answer: D



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75. Bacteria protect themselves from viruses by fragmenting viral DNA with

A. Exonuclease

B. Endonuclease

C. DNA ligase

D. Gyrase

Answer: B



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76. Ti-plasmids used in genetic engineering is obtained from :

A. *Bacillus thuringiensis*

B. *Agrobacterium rhizogenes*

C. *Agrobacterium tumefaciens*

D. *Pseudomonas syringae*

Answer: C



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77. DNA content is doubled during

A. metaphase

B. interphase

C. prophase

D. telophase

Answer: B



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78. GAATTC is the recognition site for which of the following restriction endonuclease

A. Hin d III

B. Eco R 1

C. Bam I

D. Hae III

Answer: B



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79. Plants in comparison to animals are more rapidly manipulated by genetic engineering. Select out the most probable reason for this

A. totipotency shown by plant cells

- B. single somatic cells can regenerate a whole plant body
- C. genetic engineering is supplemented with plant tissue culture techniques
- D. All of the above

Answer: D



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80. In recombinant DNA technique, the term vector refers to :

A. plasmids that can transfer foreign DNA

into a living cell

B. cosmids that can cut DNA at specific

base sequence

C. plasmids that can join different DNA

fragments

D. cosmids that can degrade harmful proteins

Answer: A



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81. The mobile genetic element is

A. transposon

B. mutation

C. endonuclease

D. variation

Answer: A



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82. Which of the cell organelle lack membrane ?

A. mesosome

B. mitochondria

C. ribosome

D. liposome

Answer: C



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83. Which one of the following palindromic base sequences in DNA can be easily cut about the middle by some particular restriction enzyme ?

A. 5' _____ CGTTCG _____ 3'

3' _____ ATGGTA _____ 5'

B. 5' _____ GATATG _____ 3'

3' _____ CTAATA _____ 5'

C. 5' _____ GAATTC _____ 3'

3' _____ CTTAAG _____ 5'

D. 5' _____ CACGTA _____ 3'

3' _____ CTCAGT _____ 5'

Answer: C



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84. Genetic engineering has been successfully used for producing:

A. transgenic mice for testing safety of polio vaccine before use in humans

B. transgenic models for studying new treatments for certain cardiac diseases

C. transgenic cow-Rosie which produces high fat milk for making ghee

D. animals like bulls for farm work as they have super power

Answer: A



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85. 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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86. DNA or RNA segment tagged with a radioactive molecule is called

A. vector

B. probe

C. clone

D. plasmid

Answer: B



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87. The vector for T-DNA is :

- A. *Thermus aquaticus*
- B. *Salmonella typhimurium*
- C. *Agrobacterium tumefaciens*
- D. *Escherichia coli*

Answer: C



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88. Which of the following is a plasmid ?

A. pBR 322

B. Bam HI

C. Sal I

D. Eco RI

Answer: A



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

A. Coelom

B. Coenzyme

C. Coli

D. Colon

Answer: C



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90. Which of the following is correctly matched?

A. *Agrobacterium tumefaciens* - Tumour

B. *Thermus aquaticus* - Bt - gene

C. pBR322 - Enzyme

D. Ligase - Molecular scissors

Answer: A



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91. PCR proceeds in three distinct steps governed by temperature they are in order of :

A. denaturation, annealing, synthesis

B. synthesis, annealing, denaturation

C. annealing, synthesis, denaturation

D. denaturation, synthesis, annealing

Answer: A



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92. Restriction enzymes are used to cut

- A. single stranded RNA
- B. double stranded DNA
- C. single stranded DNA
- D. double stranded RNA

Answer: B



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93. Which one of the following technique made it possible to genetically engineer living organisms

A. Hybridization

B. Recombinant DNA techniques

C. X-ray diffraction

D. Heavier isotope labelling

Answer: B



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



- A. replication completed
- B. deletion mutation
- C. start codon at the 5' end
- D. palindromic sequence of base pairs

Answer: D



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95. Agarose extracted from sea weeds finds use in

A. spectrophotometry

B. tissue culture

C. PCR

D. gel electrophoresis

Answer: D



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96. cDNA is

A. formed by reverse transcriptase

B. cloned by

C. circular DNA

D. recombinant DNA

Answer: A



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97. PCR and restriction Fragments length Polymorphism are the methods for

- A. Study of enzymes
- B. Genetic transformation
- C. DNA sequencing
- D. Genetic Fingerprinting

Answer: D



98. The restriction enzyme(s) used in recombinant DNA technology that makes staggered cuts in DNA leaving sticky ends is/are

- A. Eco R I
- B. Hind III
- C. Bam H I
- D. all of these

Answer: D



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

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

B. It serves as a selectable marker

C. It is isolated from a virus

D. It remains active at high temperature

Answer: D



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100. The usual source of restriction endonucleases used in gene cloning is

A. fungi

B. bacteria

C. plants

D. viruses

Answer: B



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101. 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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102. 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



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103. DNA parts which can switch their position

are

A. cistrons

B. transposons

C. introns

D. none of these

Answer: B



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104. 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

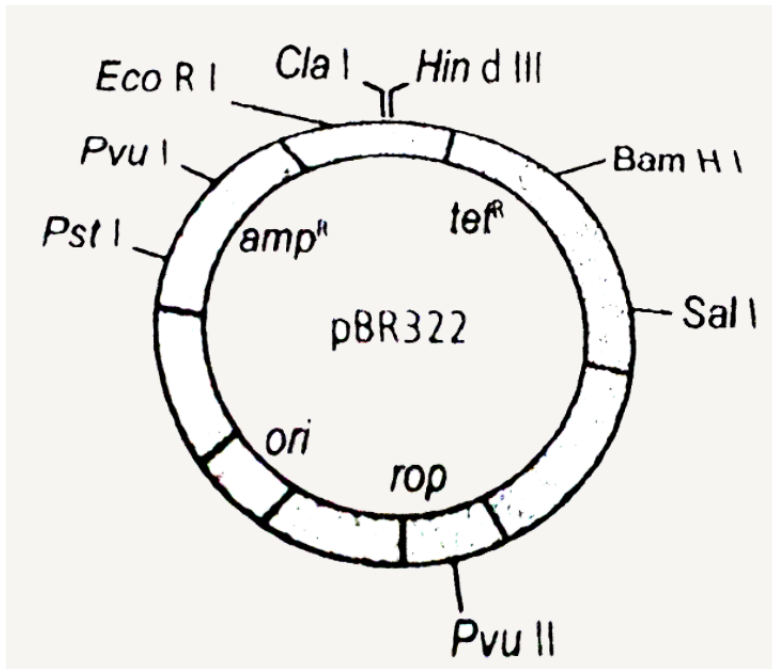


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105. The given figure is the diagrammatic representation of the *E. coli* vector pBR 322.

Which one of the given options correctly

identifies its certain component (s)?



A. *ori* - original restriction enzyme

B. *rop*-reduced osmotic pressure

C. *Hin* d III, *Eco* R I - selectable markers

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

Answer: D



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106. Which one of the following is a case of wrong matching?

A. Somatic hybridization - Fusion of two diverse cells

B. Vector DNA - Site for t RNA synthesis

C. Micropropagation - in vitro production
of plants in large numbers

D. Callus - Unorganised mass of cells

Answer: B



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107. DNA polymerase can be obtained from

A. pBR 322

B. *Thermus aquaticus*

C. *Agrobacterium tumefaciens*

D. Retro virus

Answer: B



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108. Viruses were first Crystallised by

A. Leeuwenhock

B. Ivanowsky

C. Beijerinck

D. Stanley

Answer: D



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109. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of

A. Insertional inactivation of
α-galactosidase in recombinant

bacteria

B. Inactivation of glycosidase enzyme in recombinant bacteria

C. Non-recombinant bacteria containing beta - galactosidase

D. Insertional inactivation of alphasgalactosidase in non-recombinant bacteria

Answer: C



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

- A. Electrophoresis
- B. Restriction mapping
- C. Centrifugation
- D. Polymerase chain reaction

Answer: A



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111. Which of the following is not correctly matched for the organism and its cell wall degrading enzyme?

A. Algae - Methylase

B. Fungi - Chitinase

C. Bacteria - Lysozyme

D. Plant cells - Cellulase

Answer: A



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112. Which vector can clone only a small fragment of DNA ?

A. Cosmid

B. Bacterial artificial chromosome

C. Yeast artificial chromosome

D. Plasmid

Answer: D



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

A. restriction enzymes

B. probes

C. selectable markers

D. ligases

Answer: A



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114. The introduction of t-DNA into plants involves tumefaciens

A. (a) altering the pH of the soil, then heat-shocking the plants

B. (b) altering the pH of the soil, then heat-shocking the plants

C. (c) exposing the plants to cold for a brief period

D. (d) allowing the plant roots to stand in
water

Answer: A



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115. The DNA molecule to which the gene of interest is integrated for cloning is called :

A. transformer

B. vector

C. template

D. carrier

Answer: B



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116. The taq polymerase enzyme is obtained from

A. *Thiobacillus ferrooxidans*

B. *Bacillus subtilis*

C. *Pseudomonas putida*

D. *Thermus aquaticus*

Answer: D



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117. Which of the following is a restriction endonuclease

A. Protease

B. DNAase I

C. Rnase

D. Hind II

Answer: D



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118. Stirred-tank bioreactors have been designed for :

A. purification of product

B. addition of preservatives to the product

C. availability of oxygen throughout the process

D. ensuring anaerobic conditions in the culture vessel

Answer: C



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

A. Eco R I

B. Taq polymerase

C. Polymerase III

D. Ligase

Answer: D



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120. Which of the following is not a component of downstream processing

A. Separation

B. Purification

C. Preservation

D. Expression

Answer: D



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121. Which of the following restriction enzymes produces blunt ends

A. (a) Sal I

B. (b) Eco RV

C. (c) Xho I

D. (d) Hind III

Answer: B



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122. The process of separation and purification of expressed protein before marketing is called

- A. Upstream processing
- B. downstream processing
- C. bioprocessing
- D. postproduction processing

Answer: B



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123. A gene whose expression helps to identify transformed cell is known as

A. (a) Selectable marker

B. (b) Vector

C. (c) Plasmid

D. (d) Structural gene

Answer: B



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

A. (a) pBR 322

B. (b) λ phage

C. (c) Ti plasmid

D. (d) Retrovirus

Answer: D



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