



# BIOLOGY

## BOOKS - TRUEMAN BIOLOGY

### BIOTECHNOLOGY : PRINCIPLES AND PROCESSES

#### Multiple Choice Questions

1. Biotechnology utilizes new organisms developed from present organisms utilizing

A. 1)mutations

B. 2)recombinant DNA technology

C. 3)both (1) and (2) correct

D. 4)none of these

**Answer: C**



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**2. Which of the following organelles is related to genetic engineering?**

A. 1)Lysosomes

B. 2)Plasmids

C. 3)Mitochondria

D. 4)Golgi body

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

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. 1) Molly (a sheep)

B. 2) Polly (a sheep)

C. 3) Chance (a bull)

D. 4) 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

**Answer: B**



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**18.** Who is regarded as 'father of Genetic engineering'?

A. Cohen

B. Boyer

C. Berg

D. Smith

**Answer: C**



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**19.** The term biotechnology was given in 1917  
by

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. reactor

B. vector

C. invertor

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.** The restriction "nuclease inspects" the length of a DNA sequence special sequence in the DNA recognised by restriction endonuclease is called :

A. nucleotide sequence

B. nucleoside sequence

C. palindromic nucleotide sequence

D. both (1) and (2)

**Answer: C**



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**25. Who is the father of biotechnology in India**

**?**

A. Prof of V.L. Chopra

B. Dr. Lalji Singh

C. E.J. Butler

D. S.C. Maheshwari

**Answer: A**



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**26.** Taq polymerase enzyme is used in

A. restriction mapping

B. gene cloning

C. PCR

D. all of these

**Answer: C**



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**27. 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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**28.** '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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**29.** 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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**30.** In recombinant DNA technology, a plasmid vector must be 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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**31.** 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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**32.** 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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**33.** 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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**34.** The palindromes are groups of letters that form the .....when read in both direction forward and backward

- A. 1)different words
- B. 2)same words
- C. 3)alternative words
- D. 4)both (1) and (2)

**Answer: B**



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**35.** Which of the following is a restriction endonuclease?

A. Lipase

B. Amylase

C. Alul

D. Anhydrase

**Answer: C**



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**36. Alkaline phosphatase can be isolated from**

A. bacteria

B. calf intestine

C. cat intestine

D. both (1) and (2)

**Answer: D**



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**37.** The DNA polymerase was investigated by

A. Boliver and Rodriguez

B. Korenberg

C. Stanley Cohen and Herbert Boyer

D. Bert

**Answer: B**



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**38.** 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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**39.** The first artificial cloning vector was

A. pBR322

B. M13

C. phagemid vectors

D. cosmid Vectors

**Answer: A**



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

A. *Clostridium* species

B. *Xanthomonas citri*

C. *Bacillus coagulans*

D. *Agrobacterium tumefaciens*

**Answer: D**



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**41.** 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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**42.** Crown gall disease in plants is caused by :

A. Ti plasmid

B. Pi plasmid

C. Bacteria

D. Virus

**Answer: A**



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

A. Ri plasmid

B. lambda phage

C. pBR 322

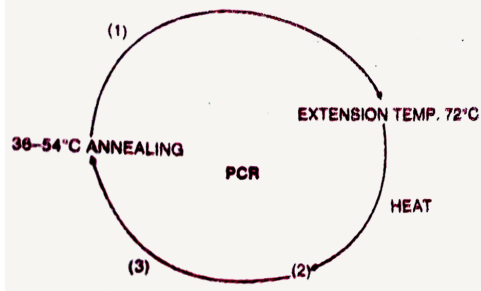
D. Ti plasmid

**Answer: D**



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**44.** Name the factors or steps indicated with numbers (1), (2) and (3)



A. (1) Taq polymerase (2) Denaturation at

$94^{\circ}C$  (3) Primer

B. (1) Denaturation at  $94^{\circ}C$  (2) Taq

polymerase (3) Primer

C. (1) Primer (2) Denaturation at  $94^{\circ}C$  (3)

Taq polymerase

D. (1) Taq polymerase (2) Extension (3)

Ligation

**Answer: A**



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

A. Zygotene

B. Diplotene



C. Metaphase I

D. Pachytene

**Answer: D**



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**46.** Large scale production of biotechnological products involves use of

A. 1)bioreactor/fermenter

B. 2)electrophoresis

C. 3)RFLP

D. 4)PCR

**Answer: A**



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**47.** The specific DNA sequence where EcoRI cuts is

A. GATTCG

B. GAATTC

C. GTTCAA

D. TTCCAA

**Answer: B**



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**48.** 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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**49.** 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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**50.** Restriction enzymes are isolated chiefly from

A. Prokaryotes

B. protists

C. protozoans

D. fungi

**Answer: A**



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**51.** 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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**52. Synthetic seeds are**

- A. chemical seed
- B. encapsulated somatic embryos
- C. clone
- D. none above

**Answer: B**



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**53.** Circular DNA is present in

- A. chloroplast
- B. mitochondria
- C. plasmid
- D. all the above

**Answer: D**



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**54.** 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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**55.** The enzymes used for separating the cells for protoplast culture are

A. 1)cellulase and pectinase

B. 2)protease and lipase

C. 3)gyrase and helicase

D. 4)endonuclease and ligase

**Answer: A**



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**56.** The vectorless gene transfer includes

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

**Answer: D**



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**57.** 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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**58.** 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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**59.** 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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**60.** Who first discovered the restriction endonuclease?

A. Smith

B. Jacob

C. Lwoff

D. Hounsfield

**Answer: A**



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**61.** 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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**62.** First restriction enzyme was isolated from

A. *E. coli*

B. *Haemophilus influenzae*

C. *Pseudomonas*

D. *Xanthomonas*

**Answer: B**



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**63.** Who first reported of restriction enzyme in bacterial cells?

A. Arber

B. Laderberg

C. Smith

D. Sanger

**Answer: A**



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**64.** 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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**65.** Foreign DNA is also called

A. vehicle DNA

B. passenger Dna

C. r-DNA

D. Vector DNA

**Answer: B**



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**66.** In Rous sarcoma virus, the flow of information is form

A. 1) DNA  $\rightarrow$  RNA  $\rightarrow$  Proteins

B. 2) RNA  $\rightarrow$  RNA  $\rightarrow$  Proteins

C. 3) RNA  $\rightarrow$  DNA  $\rightarrow$  RNA  $\rightarrow$  Proteins

D. 4) RNA  $\rightarrow$  DNA  $\rightarrow$  Proteins

**Answer: C**



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**67.** What is unique to DNA alone

- A. Denaturation and Renaturation
- B. Polymer complex
- C. Replication
- D. Resistance to temperature changes

**Answer: A**



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**68.** 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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**69.** 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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**70.** 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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71.  $T_m$  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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**72. 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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**73.** The process of reverse transcription was brought to light by the work of :

A. 1)Geroge Beadle and Edward Tatum

B. 2)Garrod

C. 3)H.W - Temin and D.Baltimore

D. 4)R.W. Holley and Grover

**Answer: C**



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**74.** 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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**75.** 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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**76.** Plasmids are used in genetic engineering because they are

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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**77. Chemical knives of DNA are :**

A. endonuclease

B. Polymerase

C. ligase



D. transcriptase

**Answer: A**



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**78.** 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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**79.** 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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**80.** Ti-plasmids used in genetic engineering is obtained from :

A. 1) *Bacillus thuringiensis*

B. 2) *Agrobacterium rhizogenes*

C. 3) *Agrobacterium tumefaciens*

D. 4) *Pseudomonas syringae*

**Answer: C**



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**81.** DNA content is doubled during

A. metaphase

B. interphase

C. prophase

D. telophase

**Answer: B**



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

A. Hind III

B. Eco RI

C. BamHI

D. Hae III

**Answer: B**



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**83.** 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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**84.** 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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**85.** The mobile genetic element is

A. transposon

B. mutation

C. endonuclease

D. variation

**Answer: A**



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**86.** Which of the cell organelle lack membrane ?

A. mesosome

B. mitochondria

C. ribosome

D. liposome

**Answer: C**



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**87.** 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' \_\_\_\_\_ CTACTA \_\_\_\_\_ 5'

C. 5' \_\_\_\_\_ GAATTCC \_\_\_\_\_ 3'

3' \_\_\_\_\_ CTTAAG \_\_\_\_\_ 5'

D. 5' \_\_\_\_\_ CACGTA \_\_\_\_\_ 3'

3' \_\_\_\_\_ CTCAGT \_\_\_\_\_ 5'

**Answer: C**



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**88.** 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 buls for farm work as they  
have super power

**Answer: A**



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**89.** 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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**90.** 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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**91.** The vector for T-DNA is :

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

**Answer: C**



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**92.** 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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**93.** 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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**94.** 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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**95.** 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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**96.** 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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**97.** Which one of the following technique made it possible to genetically engineering living organisms

A. Hybridization

B. Recombinant DNA techniques

C. X-ray diffraction

D. Heavier isotope labelling

**Answer: B**



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**98.** 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

5' \_\_\_\_\_ GAATTC \_\_\_\_\_ 3'  
3' \_\_\_\_\_ CTTAAG \_\_\_\_\_ 5'

- 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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**99.** Agarose extracted from sea weeds finds use in

A. 1)spectrophotometry

B. 2)tissue culture

C. 3)PCR

D. 4)gel electrophoresis

**Answer: D**



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**100. cDNA is**

- A. formed by reverse transcriptase
- B. cloned by
- C. circular DNA
- D. recombinant DNA

**Answer: A**



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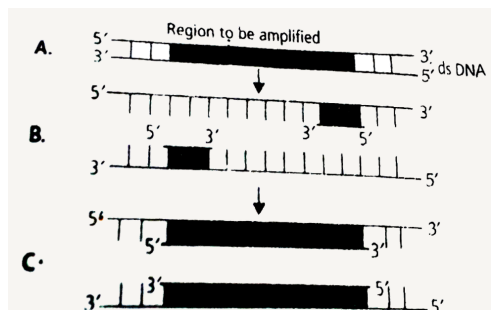
**101.** PCR and restriction Fragments length Polymorphism are the methods for

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

**Answer: D**



**102.** The figure below shown three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification to together 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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**103.** 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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**104.** 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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**105.** 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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**106.** 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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**107.** 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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**108.** DNA parts which can switch their position are

- A. 1) cistrons
- B. 2) transposons
- C. 3) introns
- D. 4) none of these

**Answer: B**



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

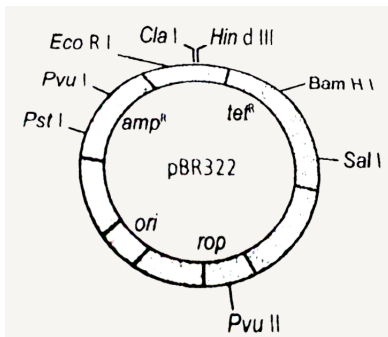
- A. bacterial DNA only
- B. viral DNA only
- C. any DNA fragment
- D. eukaryotic DNA only

**Answer: C**



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**110.** 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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**111.** which one of the following is a case of wrong matching?

A. 1) Somatic - Fusion of two

hybridization diverse cells

B. 2) Vector DNA - Site for t RNA synthesis

C. 3)Micropropagation - in vitro production  
of plants in large numbers

D. 4)Callus - Unorganised mass of cells

**Answer: B**



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**112.** DNA polymerase can be obtained from

A. pBR 322

B. *Thermus aquaticus*

C. *Agrobacterium tumefaciens*

D. Retro virus

**Answer: B**



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**113.** Viruses were first Crystallised by

A. Leeuwenhock

B. Ivanowsky

C. Beijerinck



D. Stanley

**Answer: D**



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

A. Insertional inactivation of  
alphan-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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**115.** 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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**116.** 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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**117.** 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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**118.** Commonly used vectors for human genome sequencing are

A. T/C Cloning Vectors

B. T - DNA

C. BAC and YAC

D. Expression Vectors

**Answer: C**



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**119.** 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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**120.** The introduction of t-DNA into plants involves tumefaciens

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

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

C. exposing the plants to cold for a brief period

D. allowing the plant roots to stand in water



**Answer: A**



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**121.** 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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**122.** 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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**123.** Which of the following is a restriction endonuclease

A. Protease

B. DNAase I

C. Rnase

D. Hind II

**Answer: D**



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**124.** 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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**125.** 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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**126.** 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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**127.** Which of the following restriction enzymes produces blunt ends

A. Sall

B. Eco RV

C. XhoI

D. Hind III

**Answer: B**



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**128.** 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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**129.** What is the criterion for DNA fragments /movement on agarose gel during gel electrophoresis ?

A. The larger the fragment size, the farther it moves

B. the smaller the fragment size, the farther it moves

C. positively charged fragments move to farther end

D. negatively charged fragments do not move

**Answer: B**



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

A. Selectable marker

B. Vector

C. Plasmid

D. Structural gene

**Answer: B**



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

A. Bromophenol blue

B. Acetocarmine

C. Aniline blue

D. Ethidium bromide

**Answer: A**



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

A. pBR 322

B.  $\lambda$  phage

C. Ti plasmid

D. Retrovirus

**Answer: D**



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**133.** The correct order of steps in Polymerase Chain Reaction (PCR) is

- A. Denaturation, Annealing, Extension
- B. Denaturation, Extension, Annealing
- C. Annealing, Extension, Denaturation
- D. Extension, Denaturation, Annealing

**Answer: D**



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