BIOLOGY

NEET & AIIMS

BIOTECHNOLOGY-PRINCIPLES AND PROCESSES

Example

1. Discovery of which made genetic engineering possible ?

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2. How long is the recognition sequence of the first restriction enzyme isolated ?

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3. The antibiotic resistance gene isolated by Cohen and Boyer was inserted in plasmid native to which organsim ?

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4. Give one word for following :

Sequence of bases on DNA strands which read the same forward as well as backward in 5' to 3' direction.

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5. Which is responsible for controlling the copy number of the linked DNA in a plasmid ?

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6. The gene of interest is cloned at which position in plasmid pBR322 to facilitate quick selection.

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7. If the gene of interest was cloned at Pvu I site in pBR322 ,the recombinant bacteria would exhibit resistance to which drug ?

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8. List two essential characteristics of vectors

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9. Suggest two points of difference between plasmid and chromosomal DNA.

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10. Name the reagent that helps in precipitation of DNA from solution.

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11. DNA is enclosed within membranes in an E.coli . Suggest a reagent /molecule that can help to release trapped DNA

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12. Why and how bacteria can be made 'competent' ?

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13. What is trasnformation of bacterial cell ?

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Try Yourself

1. What do you understand by staggered ends ?

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2. What is the end product obtained after exonuclease activity ?

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3. What does 'co' represent in term EcoRl ?

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4. Name the enzyme used to combine two fragments of DNA .

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5. What is a clone ?

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6. What is the basis of selection in a plasmid-containing gene lac Z ?

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7. List two commonly used vectors.

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8. Unique restriction sites are present in a small region of DNA in a vector . What is this region called /

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9. What is the casuse of Crown Cell disease in plants ?

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10. How has Ti plasmid been disarmed ?

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11. Give an example of disarmed viruses used as vector in animals .

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12. Restrictioni enzymes work under optimal conditions . Commnet.

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13. The technique used for separation of DNA fragments obtained after RE digestion is _____.

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14. Gel electrophoresis separates DNA molecules according to their _____.

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15. Write T/F : PCR is DNA replication on a grander scale.

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16. What is a sparger ?

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17. Filtration and centrifugation for separation of products and cells produced during biosynthetic stage or collectively referred as _____.

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Exercise

1. A researcher identifies a naturally occuring variant possessing characteristics of interest . This plant is selectively bred. This is an example of

A. Traditional plant breeding

B. Transgenic technology

C. Mutant selection

D. Cross breeding

Answer: A

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2. Bacteria possessing restriction endonucleases remain

A. Affected by bacteriophages

B. Resistant to bacteriophages

C. Resistant to drugs

D. Resistant to heat

Answer: B

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3. Introduction of foreign genes for improving genotype is

Or

Insertion or deletion of one or more new genes which are absent in an organism by artificial method (not by reproduction) is called as

A. Biotechnology

B. Tissue culture

C. Genetic engineering

D. Both (1) & (2)

Answer: D

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4. The linking of antibiotic resistance gene with the plasmid vector became possible with

A. DNA polymerase

B. Exonuclease

C. DNA ligase

D. Endonuclease

Answer: C

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5. Chemical knives of molecular biology are

A. Restriction endonuclease

B. Exonuclease

C. Reverse transcriptase

D. Ligase

Answer: A

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6. Plasmids are extra-chromosomal genetic material found in

A. Algae

B. Mammalian cell

C. Bacteria

D. Viruses

Answer: C

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7. Which of the following bonds are formed by action of DNA ligase ?

A. Sugar-phosphate bond

B. Phosphodiester bond

C. Phosphate-phosphate bond

D. Both (1) & (2)

Answer: D

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

A. Modified DNA ligase

B. A heated alkaline solution

C. The same enzyme that cleaves donor DNA

D. Different enzyme that cleaved the donor DNA

Answer: C

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9. Who is given for constructing first atrificial recombinant molecule ?

A. Hargovind Khorana

B. Staniey Cohen and Herbert Boyer

C. Linus pauling

D. Arber and Nathans

Answer: B

10. The specific DNA sequence where EcoRI cuts is

A. G A TT C G

B. G A A T T C

C. G T T C A A

D. T T C C A A

Answer: B

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11. Identify the plasmid among following

A. Hind III

B. Pbr322

C. λ-phage

D. Both (2) & (3)

Answer: B

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12. Plasmids are important in biotechnology because they contian

A. Recognition sites on recombinant DNA strands

B. Provirus incorporated into the host DNA

C. A vehicle for insertion of recombinant DNA into bacteria

D. Surface for respiratory process in bacteria

Answer: C

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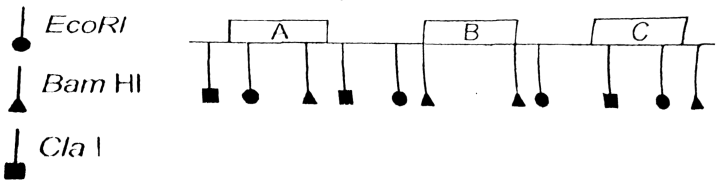
13. If only gene 'B' is to be isolated from given fragment of DNA , what is the choice of enzyme ?



A. Bam HI

B. EcoRI & Bam HI

C. EciRI only

D. All the three enzymes

Answer: A

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14. If gene of interest was inserted at Sal I site in Pbr322 THE RESULTING PLASMID WILL CONFER RESISTANCE TO

A. Ampicillin

B. Tetracycline

C. Kanamylin

D. Both (1) & (2)

Answer: A

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15. Tumor including plasmid transforms

A. Nematodes

B. Bacteria

C. Fungi

D. Several dicot plants

Answer: D

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16. Bacterium commonly used in plant genetic engineering is

A. E. coli

B. Agrobacterium

C. Mycobacterium

D. Rhizobium

Answer: B

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17. In RDT, the term vector refers to

A. Plasmids that can transfer foreign DNA into a living cell

B. Plasmids that can cut DNA at specific bases

C. Plasmids that can join DNA at specific bases

D. Plasmids that can degrade harmful protiens

Answer: A

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18. The tumor including capacity of _A_ is located in large extra-chromosomal plasmid called Ti plasmid. Choose the option which correctly fills up the blanks _A_

A. Thermus aquaticus

B. Salmonella typhimurium

C. E.coli

D. Agrobacterium tumefaciens

Answer: D

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19. Genetic material of retroviruses is

A. ss DNA

B. ss RNA

C. Protein

D. ds DNA

Answer: B

20. Characteritics of vector include al, except

A. Presence of 'ori'

B. Presence of antibiotic gene as selectable marker

C. Large size

D. MCS

Answer: C

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21. which is not true for all cloning vectors ?

A. These are independent of the control of chromosomal DNA

B. These get integrated into chromosomal DNA after transformation

C. They contain genes antibiotic resistance or some selectable marker

D. They have 'ori' region

Answer: B

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22. M 13 can be classified as which kind of vector ?

A. Cosmid

B. YAC

C. BAC

D. Bacteriophage

Answer: D

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23. Boliver and Rodriguez developed

A. Shuttle vector

B. pBR322

C. Puc19

D. Both (1) & (2)

Answer: B

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24. Shuttle vectors are not exemplified by

A. Yep

B. Ti plasmid

C. BAC

D. Both (2) & (3)

Answer: C

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25. Which vector is used to introduce genes into dicots ?

A. Electroporation

B. Electrophoresis

C. Ti plasmid infection

D. Microinjection

Answer: C

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26. Addition of antibiotics in chemical engineering process helps in

A. Mixing and aeration of media

B. Maintaining anti-foaming conditions

C. Maintaining aseptic conditions

D. Maintainance of constant temperature and Ph

Answer: C

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27. Genes for which of the following can serve as selectable marker ?

A. β-galactosidase

B. Ampicillin

C. Tetracycline

D. All of these

Answer: D

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28. Telomeric sequence, centromere , autonomously replicating sequence from yeast are characteristics features of

A. YAC

B. Bacteria

C. Retrovirus

D. All of these

Answer: A

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29. When the addition of foreign DNA is made in the coding sequence of β-galactosidase in Puc19 , this results in

A. Direct DNA injection

B. Transfection

C. Insertional inactivation

D. Transformation

Answer: C

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30. Isolation of genetic material from fungal cells involves the use of

A. Lysozyme

B. Cellulase

C. Chitinase

D. Polymerase

Answer: C

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31. Which of the following methods can be used for making the bacterial cell " competent" ?

A. Treating with specific concentration of divalent cation $\left(Ca^{+2}\right)$

B. Treating with specific cocentration of monovalent cation $\left(K^{+}\right)$

C. Heat shock

D. Both (1) & (3)

Answer: D

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32. Which of the following explains the role of the heat shock during transformation ?

A. Binding of DNA to bacterial cell wall

B. Uptake of DNA through transient pores

C. Decreased efficiency of transformation

D. All of these

Answer: B

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33. PCR technique is best for

A. DNA synthesis

B. Protein amplification

C. DNA amplification

D. DNA ligation

Answer: C

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34. Which of the following are not required while performing a transformation experiment ?

A. Insert DNA

B. Ice cold calcium chloride

C. 90°

D. Bacterial cells

Answer: C

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35. Which of the following methods gave birth to idea of gene immunization ?

A. Microinjection

B. Direct DNA injection

C. Biolistic

D. Both (1) & (3)

Answer: B

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36. Which of the following is not an application of PCR ?

A. ELISA

B. Diagnosis of pathogens

C. DNA fingerprinting

D. In palaeontology

Answer: A

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37. Name the organism which is the source of heat -stable PCR enzyme

A. Thermophilus aquaticus

B. Haemophillus influenzae

C. Thermo proteus

D. Bacillus thuringiensis

Answer: A

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38. Which of the following is not correct for a successful PCR ?

A. Thermostable DNA polymerase

B. Nanogram of DNA template

C. Primer with exposed 5-OH group only

D. Deoxyribonucleoxide triphosphate

Answer: C

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39. Method in which recombinant DNA is directly injected into the nucleus of animal cell by using microneedles is called

A. Gene Gun method

B. Biolistic method

C. Microinjection method

D. Direct DNA injection method

Answer: C

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40. The mos commonly used bioreactor is of stirring type. The stirrer facilitates

A. Temperature control

B. Ph control

C. Oxygen availability

D. Product removal

Answer: C

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Assignment Section A Objective Type Questions

1. Select the option that is incorrect w.r.t. traditional hybridisation

A. Procedure extensively used in plant breeding

B. Often leads to inclusion of undesirable genes

C. Involves selective inclusion and multiplication of desired genes only

D. Enabled qualitative and quantitative improvement in food production

Answer: C

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2. Credit for construction of first recombinant DNA may be given to

A. Charles Darwin and Alfred Wallace

B. Stanley Cohen and Herbert Boyer

C. Meselson and Stahl

D. Esther and Joshua Lederberg

Answer: B

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3. Which of the following is the most accepted definition of biotechnology by European Federation of Biotechnology ?

A. Maintenance of sterile ambience for enabling growth of desired microbe/eukaryotic cell in large quantities

B. Technique of using live organism or enzyme from organisms to produce and processes useful to animals

C. Process which use genetically engineered animals only on a large scale for benefit of mankind

D. The integration of natural science and organisms cells, parts thereof and molecular analogies for products and services

Answer: D

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4. Which of the following enzymes has been incorrectly matched with their function ?

A. Ligase -Molecular glue

B. Endonuclease -Chemical scalpel

C. DNA polymerase-Joins nucleosides

D. RNA polymease-Joins nucleotides

Answer: C

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5. The first restriction enzyme to be isolated and characterised was

A. EcoRI

B. BamHI

C. Hind III

D. Hind II

Answer: D

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6. Which of the following represents a correct palindromic sequence recognised by EcoRI ?

A. $5' - \overset{\downarrow}{G}AATTC - 3'$

$5' - CTTAA\underset{\uparrow}{G} - 3'$

B. $5' - CCC\overset{\downarrow}{C}GGG - 3'$

$3' - GGG\underset{\uparrow}{C}CC - 5'$

C. $5' - \overset{\downarrow}{G}AATTC - 3'$

$3' - CTTAA\underset{\uparrow}{G} - 5'$

D. $5' - ATGC\overset{\downarrow}{C}G - 3'$

$3' - TACG\underset{\uparrow}{\overline{G}}C - 5'$

Answer: C

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7. Which has the ability to transform normal cells into cancerous cell ?

A. Ti plasmid

B. Retrovirus

C. All plasmids

D. Both (1) & (2)

Answer: D

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

A. DNA can be seen in visible light

B. DNA can be seen without staining in visible light

C. Ethidium bromide stained DNA can be seen in visible light

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

Answer: D

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9. Term 'Restriction' in Restriction endonuclease enzyme refers to

A. Cleaving of phosphodiester bond in DNA by the enzyme

B. Cutting of DNA at specific position only

C. Preventing of bacteriophage multiplicatioin in bacteria

D. Cutting each of two strands of DNA at specific points in sugar phosphate backbone

Answer: C

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10. In agarose gel eletrophoresis DNA molecules are separated on the basis of their:

A. Charge only

B. Size only

C. Charger to size ratio

D. Both (1) & (3)

Answer: B

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11. While isolating DNA from bacteria, which of the following enzymes is not used ?

A. Lysozyme

B. Ribonuclease

C. Protease

D. Deoxyribonuclease

Answer: D

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12. Significance of treating bacterial cells with calcium chloride before transformation is to facilitate

A. Binding to DNA to the cell surface

B. Uptake of DNA through membrane transport proteins

C. Uptake of DNA by creating transient pores in the bacterial cell wall

D. Expression of antibiotic resistance gene

Answer: A

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13. Which of the following steps is/are catalysed by Taq polymerase in a PCR ?

A. Denaturation of template DNA

B. Annealing of primers to template DNA

C. Extension of primer end on template DNA

D. All of these

Answer: C

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14. Who among the following was awarded the Nobal Prize for the development of PCR technique ?

A. Herbert Boyer

B. Kary Mullis

C. Rene Descrates

D. Andrew Fire

Answer: B

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15. Which of the following statements does not hold true for restriction enzyme?

A. It recognises a palindronic nucleotide

B. It is an endonuclease

C. It is isolated from bacteriophages

D. It produces the same kind of sticky ends in different DNA molecules

Answer: C

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16. Gene of interest was cloned at site Sal I in Pbr322. The recombinant plasmid will exhibit susceptibilty to

A. Tetracycline

B. Tetracycline and Ampicilin

C. Ampilicin only

D. Broad spectrum of antibodies

Answer: A

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17. Method involving entry og high velocity gold microparticles coated with DNA into plant cell is

A. Protoplast fusion

B. Transfection

C. Biolistics

D. Magic bullet action

Answer: C

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18. Pure DNA precipated by addition of chilled ethanol can be removed from solution by

A. Elution

B. Gel electrophoresis

C. Spooling

D. PCR

Answer: C

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19. The optimum temperature for polymerisation in PCR is _____ while the enzyme responsible for the mentioned step

can tolerate temperature upto _____.

Select the correct option according to the blanks.

A. $95^{\circ}C, 60^{\circ}C$

B. $94^{\circ}C, 95^{\circ}C$

C. $72^{\circ}C, 95^{\circ}C$

D. $95^{\circ}C, 72^{\circ}C$

Answer: C

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20. Cells in continuous culture system are maintained in

A. Stationary phase

B. Lag phase

C. Log phase

D. Either (1) or (3)

Answer: C

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21. In case of Bam HI , H represents

A. Genus

B. Species

C. Name of scientist

D. Strain

Answer: D

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22. Stirreer in stirred tank type bioreactor facilities

A. Oxygen delivery from outside to inside

B. Mixing and aeration

C. Temperature control

D. Foam control

Answer: B

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23. Function of 'ori' site in a vector is to

A. Initiate insertional inactivation

B. Initiate replication

C. Codes for the proteins involved in replication of the plasmid

D. Initiate antibiotic resistance

Answer: B

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24. Name E.coli cells carry resistance against which of the following antibiotics ?

A. Chloramphenicol

B. Ampicillin

C. Tetracycline

D. None of these

Answer: D

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25. Seperation and purification by filtiration , centrifugation of desired compound produced in bioreactor is a part of

A. Downstream processing only

B. Scaling up and downstream processing

C. Upstream processing

D. Screening for recombinants and downstream processing

Answer: A

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Assignment Section B Objective Type Questions

1. A chimaeric DNA is formed by

A. Deleting selectable markers

B. Joining c-DNA with plasmid

C. EcoRI

D. Enzyme $\beta - galac \rightarrow sidase$

Answer: B

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2. Although the Ti plasmid has revolutionised plant genetic engineering one limitation of its use is that it

A. Cannot infect broad leaf plants

B. Cannot be used on fruits-bearing plants

C. Cannot be used on fruits-bearing plants

D. Does not infect cereal plants such as corn and rice

Answer: D

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3. A plasmid

A. Shows dependent assortment

B. Has ability to replicate within bacterial cells independent of the control of chromosomal DNA

C. Cannot replicate

D. Contains genes for vital activities

Answer: B

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4. Which of the following is not a method of introducing alien DNA into host cells ?

A. Micro injection

B. Heat shcok method

C. Being placed along with the cell into a gene gun

D. Gel electrophoresis

Answer: D

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5. Each restriction endonuclease functions by inspecting the length of a DNA sequence . It cleaves _____

A. Only the master strand to produc sticky end

B. Sense strand of DNA to produce sticky ends

C. Each of the two strands of the double helix at specific points in their sugar phosphate backbones

D. Messenger RNA to remove exons

Answer: C

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6. Which enzyme is required to prevent unwanted self-ligation of vector DNA molecules in recombinant DNA technology ?

A. DNA polymerase

B. DNA ligase

C. Alkaline phosphatase

D. Reverse transcriptase

Answer: C

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7. A set of bacterial clones, ech containing a plasmid or phage is called

A. Gen library

B. Gene pool

C. Genophore

D. Genome

Answer: A

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8. Which of these are most widely used in genetic engineering ?

A. Plastid

B. Plasmid

C. Mitrocondria

D. Ribosome

Answer: B

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9. A tumor including plasmid widely used in the production of transgenetic palnts is that of

A. Escherichia coli

B. Bacillu thuringgiensis

C. Staphylococcus aureus

D. Agrobacterium tumefaciens

Answer: D

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10. During the process of isolation of DNA, chilled ethanol is added to

A. Remove proteins such as histones

B. Precipitate DNA

C. Break open the cell to release DNA

D. Facilitate action of restriction enzymes

Answer: B

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11. Agarose extracted from sea weeds finds use in

A. Gel electrophoresis

B. Spectrophotometry

C. Tissue culture

D. PCR

Answer: A

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12. Which of the following is not a basis of difference between plasmid and chromosomal DNA ?

a.Presence of histones

b. Nature of histones

c. Nature of nucleotide

d. Linear form of genetic material

A. b & c only

B. a & d only

C. a , b , & d only

D. a , b , c & d

Answer: A

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13. An antibiotic resistance gene in a vector usually helps in the selection of

A. Competent cells

B. Transformed cells

C. Recombinant cells

D. Both (2) & (3)

Answer: D

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14. Select the option that excludescharacteristics applicable to plasmids

a. Circular DNA

b. Linear DNA

c. Present in all bacteria

d. Contain essential genes

e. Extra chromosomal self-replicating

A. b & d only

B. b , c & d only

C. d , b , e , & c only

D. a only

Answer: B

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15. PCR is used for

A. Reverse transcribing RNA into DNA

B. Digesting DNA

C. Amplifying DNA

D. Amplifying proteins and separating DNA

Answer: C

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16. Term 'Disarmed ' in disarmed vector represents

A. Removal of T-DNA from Ti plasmid

B. Insertional inactivation of $\beta - galac \rightarrow sidase$ gene

C. Insertional inactivation of antibiotic gene

D. Both (2) & (3)

Answer: A

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17. Method in which recombinant DNA is directly injected into the nucleus of animal cell by using microneedles is called

A. Gene Gun method

B. Biolistic method

C. Microinjection method

D. Indirect method

Answer: C

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18. Which of the following represents an advantage of growing cells in continuous culture as compared to a shake flask ?

A. Cells can be maintained at a constant physiological state

B. Most downstream and upstream processes are continuous in nature

C. Continuous reactors do not need to be shut down and cleaned regularly

D. All of these

Answer: D

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Assignment Section C Previous Years Questions

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

A. Selectable marker

B. Vector

C. Plasmids

D. Structural gene

Answer: A

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2. DNA fragments are

A. Positively charged

B. Negatively charged

C. Neutral

D. Either positively or negatively charges depending on their size

Answer: B

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3. 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: D

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4. What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis ?

A. The large the fragmetn 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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5. 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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6. A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using

A. Eco RI

B. Taq polymerase

C. Polymerase III

D. Ligase

Answer: D

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7. 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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8. Which of the following restriction enzymes produces blunt ends ?

A. Sal I

B. Eco RV

C. Xho I

D. Hind III

Answer: B

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9. Which of the following is not a feature of the plasmids ?

A. Single-stranded

B. Independent replication

C. Circular structure

D. Transferable

Answer: A

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10. The taq polymerase enzyme is obtained from

A. Pseudomonas putida

B. Thermus aquaticus

C. Thiobacillus ferroxidans

D. Bacillus subtillis

Answer: B

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11. Which of the following is a restriction endonuclease ?

A. Rnase

B. Hind II

C. Protease

D. Dnase I

Answer: B

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12. The DNA molecule to which the gene of interset is integrated for cloning is called

A. Carrier

B. Transformer

C. Vector

D. Template

Answer: C

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

A. Ligases

B. Restriction enzymes

C. Probes

D. Selectable markers

Answer: B

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

A. Bacterial artificial chromosome

B. Yeast artificial chromosome

C. Plasmid

D. Cosmid

Answer: C

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15. DNA fragments generated by restriction endonucleases in a chemical reaction can be separated by

A. Polymerase chain reaction

B. Electrophoresis

C. Restriction mapping

D. Centrifugation

Answer: B

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

A. Plant cells - Cellulase

B. Algae - Methylase

C. Fungi - Chitinase

D. Bacteria - Lysozyme

Answer: B

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

A. Insertional inactivation of alpha - galactosidase in non-recombinant bacteria

B. Insertional inactivation of alpha - galactosidase in recombinant bacteria

C. Inactivation of glycosidase enzyme in recombinant bacteria

D. Non-recombinant bacteria containing beta-galactosidase

Answer: B

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

A. It is isolated from a virus

B. It remains active at high temperature

C. It is used to ligate introduced DNA in recipient cells

D. It serves as a selectable marker

Answer: B

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19. For transformation, micro-particles coated with DNA to be bombarded from gene gun are made up of

A. Silicon or Platinium

B. Gold or Tungsten

C. Silver or Platinium

D. Platinium or Zinc

Answer: B

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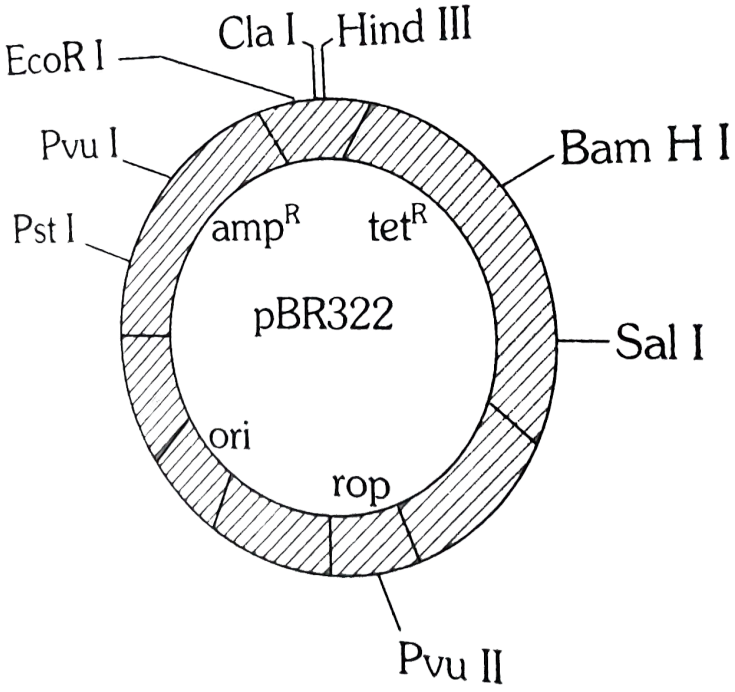
20. The figure below is the diagrammatic representation of the E.coli vector pBr 322. which one of the given options correctly identifies its certain component (s)



A. amp^R ,$tet^R - antibiotic$ resistance genes

B. Ori-original restriction enzyme

C. Rop-reduced osmotic pressure

D. Hind III , EcoRI-selectable markers

Answer: A

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21. Biolistics (gene-gun) is suitable for

A. DNA fingerprinting

B. Disarming pathogen vectors

C. Transformation of plant cells

D. Constructing recombinant DNA by joining with vectors

Answer: C

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22. In genetic engineering, the antibiotics are used

A. To keep the cultures free of infection

B. As selectable mrarkers

C. To select healthy vectors

D. As sequences from where replication starts

Answer: B

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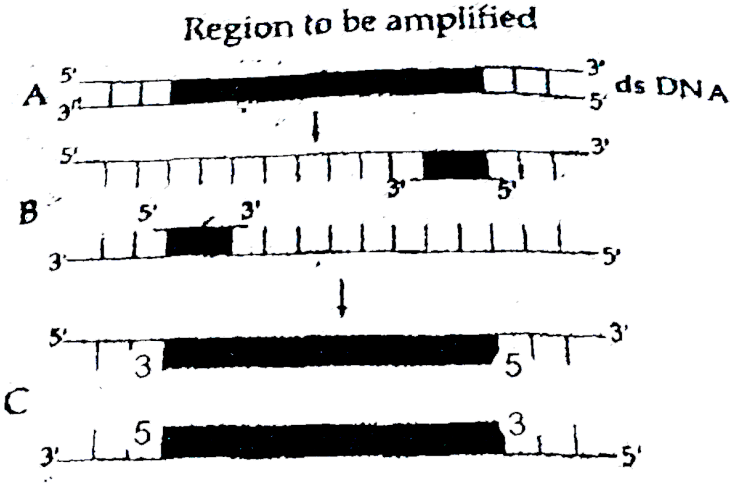
23. The figure below shows three steps (A , B, C) of polymerase chain reaction (PCR) . Select the option giving correct identification together with what it represent ?



A. A - Annealing with two sets of primers

B. B- Denaturation at a temperature of about 98° separating the two DNA strands

C. A- Denaturation at a temperature of about 50°

D. C - Extension in the presence of heat stable DNA polymerase

Answer: D

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24. Which one of the following represents a palindromic sequence in DNA?

A. 5' - GAATTC - 3'

3' - CTTAAG - 5'

B. 5' - CCAATG - 3'

3' - CAATCC - 5'

C. 5' - CATTAG - 3'

3' - GATAAC - 5'

D. 5' - GATACC - 3'

3' - CCTAAG - 5'

Answer: A

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25. There is a restriction endonuclease called EcoRI. What does 'co' part in it stand for?

A. coli

B. colon

C. coelom

D. coenzyme

Answer: A

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26. Given below is a sample of a protein 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. Palindromic sequence of base pairs

B. Replication completed

C. Deletion mutation

D. Start codon at the 5' end

Answer: A

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27. Which one of the following techniques made it possible to gnetically engineer living organisms ?

A. Heavier isotope labelling

B. Hybridization

C. Recombinant DNA techniques

D. X-ray difraction

Answer: C

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28. Continous addition of sugars in 'fed batch' fermentation is done to

A. Degrade sewage

B. Produce methane

C. Obtain antibiotics

D. Purify enzymes

Answer: C

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29. Agarose extracted from sea weeds finds use in

A. Gel electrophoresis

B. Spectrophotometry

C. Tissue culture

D. PCR

Answer: A

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30. Which one of the following is used as vector for cloning genes into higher organisms ?

A. Retrovirus

B. Baculovirus

C. Salmonella typhmurium

D. Rhizopus nigricans

Answer: A

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31. Which one of the following palindromic base sequences in DNA can be easily cut by EcoRI ?

A. 5'.....CACGTA.....3'

3'.....CTCAGT.....5'

B. 5'.....CGTTCG.....3'

3'.....ATGGTA.....5'

C. 5'.....GATATG.....3'

3'.....CTACTA.....5'

D. 5'.....GAATTC.....3'

3'.....CTTAAG.....5'

Answer: D

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32. Restriction endonucleases are enzymes which:

A. Remove nucleotides from the ends to the DNA moleculs

B. Make cuts at specific positions within the DNA molecules

C. Recognize a specific nucleotide sequence for binding of DNA ligas

D. Restrict the action of the enzyme DNA polymerase

Answer: B

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33. Stirred-tank bioreactors have been designed for

A. Availability of oxygen throughout the process

B. Addation of preservatives to the product

C. Purification of the product

D. Ensurling anaerobic conditios in the culture vessel.

Answer: A

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34. Which is used in gene cloning

A. Nucleoids

B. Lomasomes

C. Mesosomes

D. Plasmids

Answer: D

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35. 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. (A),(B) & (D) only

B. (A) only

C. (A) & (C) only

D. (B) & (D) only

Answer: D

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36. Gel electrophoresis is used for

A. Isolation of DNA molecule

B. Cutting of DNA into fragments

C. Separation of DNA fragments according to their size

D. Construction of recombinant DNA by joining with cloning vectors

Answer: C

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37. The linking of antibiotic resistance gene with the plasmid vector became possible with

A. Exonucleases

B. DNA ligase

C. Endouncleases

D. DNA polymerase

Answer: B

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38. Restriction endonuclease -

A. Cuts the DNA molecules randomly

B. Cuts the DNA molecules at specific sites

C. Restricts the synthesis of DNA inside the nucleus

D. Synthesizes DNA

Answer: B

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39. Two microbes found to be very useful in genetic engineering are :

A. Escherichia coli and Agrobacterium

B. Vibrio cholerae and a tailed bacteriophage

C. Diplococuus sp. And Pseudomonas sp.

D. Crown gall bacterium and Caenorhabditis

Answer: A

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40. Production of a human protein in bacteria by genetic engineering is possible because

A. Bacterial cell can carry out the RNA splicing reactions

B. The human chromosomes can replicate in bacterial cell

C. The mechanism of gene regulation is identical in humans and bacteria

D. The genetic code is universal

Answer: D

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41. Which one of the following hydrolyses internal phosphodiester, bonds in a polynucleotide chain

A. Lipase

B. Exonuclease

C. Endouncleases

D. protease

Answer: C

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42. All the following statements about Stanley Cohen and Herbert Boyer are correct but one is wrong. Which one is wrong

A. They discovered recombinant DNA (r-DNA) technology which marked the birth of modern biotechnology

B. They first produced. Healthyl sheep clone, a Finn Dorst lamb, Dolly from the differentaited adult mammary cells.

C. They invented genetic engineering by combining a piece of foreign DNA containing a gene from a bacterium with

a bacterial (E coli) plasmid using the enzyme restriction endonuclease

D. They isolated the antibiotic resistance gene by cutting out a piece of DNA from a plasmid which was responsible for conferring antibiotic resistance .

Answer: B

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43. There re three basic steps in genetically madifying an organism. Which of the following is wrong statement about the process ?

A. Identification of the DNA with desirable genes

B. Cleaving DNA segments with 'ligase' and joining them with endonuclease

C. Introduction of the identified DNA into the host

D. Maintenance of introduced DNA in the host and transfer of DNA to its progeny

Answer: B

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44. What is true and plasmid ?

A. Plasmids are used widel in gene transfer

B. These are found in viruses

C. Plasmids contain genes for vital activities

D. These are main part of chromosomes

Answer: A

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45. The extraction of DNA fragment from agarose gel is called_____ .

A. Down stream processing

B. Upstream processing

C. Elution

D. Insertional inactivation

Answer: C

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46. In plant biotechnology , PEG is used in:

A. Protoplast isolation

B. Cell culture preparation

C. Protoplast fusion

D. Hardening

Answer: C

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47. Restricito enzymes cut the strand of DNA a little away from the centre of the palindromic site, but between the same two bases on the opposite single stranded strand, these

overhanging stretches formed on each strand are called _____

A. Blunt ends

B. Stickly ends

C. Staggered end

D. Both (2) & (3)

Answer: D

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48. Which of the following is considered as molecular glue ?

A. Alkaline phosphatase

B. Restriction endonuclease

C. DNA ligase

D. DNA polymerase

Answer: C

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49. Genetic engineering is possible because

A. DNA can be cut at specific site by endonucleases like DNAase

B. Restriction endonucleases purified from bacteria can be used in vitro

C. The phenomenon of transduction in bacteria is well understood

D. DNA can be seen by electron microsocpe

Answer: B

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50. What would happen if a recombinant DNA is inserted within the coding sequence of an enzyme, β-galactosidase ?

A. This will result in the inactivation of the eznyme

B. The presence of chromogenic substrate will give blue coloured colonies

C. The recombinant colonies do not produce any colour

D. Boht (1)& (3) are correct

Answer: D

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51. Plasmids are used in genetic engineering because they are

A. Easily available

B. Able ot integrate with host chromosome

C. Able to replicate along with chromosome DNA

D. May contain DNA sequences coding for drug resistance

Answer: D

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52. The term 'B' and 'R' in the name pBR322 represents which of the following ?

A. Name of the scientists

B. Name of the restriction endonuclease enzymes

C. Name the cities in U.S.A

D. Name of the strain of bacterias used

Answer: A

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53. You suspect your patient to be suffering from a bacterial disease, however the number of bacteria in the patient's body is very less. Which method can help you detect these pathogens in the laboratory ?

A. Hybridoma technology

B. PCR

C. Somatic hybridization

D. DNA fingerprinting

Answer: B

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54. Downstreaming process in biotechnology refers to

A. The process which includes separation and purification of the product , after the completion of the biosynthetic stage

B. Large scale production of a product , by using bioreactors

C. The cells harbouring cloned genes of interest being grown on a small scale

D. The microbes which act upon the substrate are cultured and added into the fermenter

Answer: A

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55. cDNA is

A. Formed by reverse transcriptase

B. Cloned DNA

C. Circular DNA

D. Recombinant DNA

Answer: A

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Assignment Section D Assertion Reason Type Question

1. A: DNA ligase plays an important role in recombinant DNA technology.

R: The linking of antibiotic resistance gene with plasmid vector became possible by enzyme DNA ligase

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation

of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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2. A: Restriction enzymes belong to a larger class of enzymes called nucleases.

R: Each restriction enzymes recognises sequence in the DNA.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: B

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3. A: During gel electrophoresis, the DNA fragments move towards the anode.

R: DNA fragments are negatively charged molecules .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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4. A: Selection of recombinants due to inactivation of antibiotics is cumbersome procedure.

R: It requires simultaneous plating on two plates having different antibiotics.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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5. A: Taq Polymerase is involved in PCR technique.

R: This enzyme remain active during the high temperature including denaturation of double stranded DNA.

A. If both Assertion & Reason are true and the reason is the correct explanation of

the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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6. A: Myocardial infarction can now be treated more effectively due to genetic engineering

R: Streptokinase produced by Streptoccous and modified by RDT is used as a clot buster for removing thrombus.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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7. A: Disarmed Ti plasmid can be utilised as a shuttle vector.

R: It can survive in both prokaryotic and eukaryotic organisms.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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8. A: Pst I generates single stranded over hanging stretches in DNA after digestion that facilitate ligation.

R: These short extensions can form phosphodiester bonds with their complementary counterparts.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: C

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9. A: Ethidium bromide helps in visualizing DNA in UV light only.

R: This intercalating agent absorbs light in range 260-330 nm.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: A

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10. A: To extract RNA from tomato cells it must first be treated with cellulase, protease and then deoxyribonuclease.

R: Deoxyribonuclease will digest DNA while RNA will be intact.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer: B

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