BIOLOGY

BOOKS - A2Z BIOLOGY (HINGLISH)

BIOTECHNOLOGY: PRINCIPLES AND PROCESSES

Section A Topicwise Questions Topic 1 Principles Of Biotechnology

1. The techniques of using live organisms or enzymes from organisms to produce products and processes useful to humans are called

A. Biopiracy

B. Biotechnology

C. Bioprospecting

D. Biomagnification

Answer: B

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2. The EFB stand for

A. European Forum of biotechnology

B. Engineering Federation of biotechnology

C. European Function on biotechnology

D. European Fedration of biotechnology

Answer: D

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3. The EFB has given a definition of biotechnology that encompasses both traditional view and modern molecular biotechnology. The definition given by EFB is as follows

A. The use of bio-resources by multinational companies and other organisation without proper authorization from the countries and

people concerned without compensatory payment

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

C. Industrial scale production of biopharmaceuticals and biologicals using genetically modified microbes, fungi, plants and animals

D. Techniques to alter the chemistry of genetic material (DNA and RNA), to introduce these into host organisms and thus change the phenotype of the host organism

Answer: B

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4. The core technique(s) that enabled the birth of modern biotechnology is/are

A. Genetic engineering

B. Maintenance of sterile ambiance in chemical engineering processes to enable growth of only the desired microbe/eukaryotic cell in large quantities for the manufacture of

biotechnological products like antibiotics, vaccines, enzymes, etc

C. Both A and B

D. None of the above

Answer: C

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5. The techniques of genetic engineering include

A. Creation of recombinant DNA

B. Gene cloning

C. Gene transfer

D. All of the above

Answer: D

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6. If an alien DNA is linked with the origin of replication this alien piece of DNA can

replicate and multiply itself in the host organism. This can be called as

A. Cloning

B. Making multiple identical copies of any template DNA

C. Splicing

D. Both A and B

Answer: D

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7. There are three basic steps in genetically modifying an organism. Arrange these steps in correct sequence

(a) Introduction of the identified DNA inot the host.

(b) Maintenance of introduced DNA in the host and transfer of the DNA to its progeny.

(c) Identification of DNA with desirable genes

A. $a \rightarrow b \rightarrow c$

B. $b \rightarrow c \rightarrow a$

C. $c \rightarrow b \rightarrow a$

D. $c \rightarrow a \rightarrow b$

Answer: D

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8. All human knowledge especially natural sciences were directed to develop technologies which add to the comports to human life, since the days of

A. Herber Boyer (20^{th} Century)

B. Boyer and Cohen (19^{th} Century)

C. Rene Descartes (18^{th} Century)

D. Rene Descartes (17^{th} Century)

Answer: D

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9. Which of the following is a biotechnological process ?

A. IVF leading to 'test tube' baby

B. Developing a DNA vaccine

C. Synthesising a gene and using it

D. All of the above

Answer: D

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10. First recombinant DNA was constructed in the year

A. 1963

B. 1974

C. 1981

D. 1972

Answer: D

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11. Who develop a method of removing plasmids from the cell and then reinserting them in other cells ?

A. Herbert Boyer

B. Stanley Cohen

C. Cohen and Boyer

D. Karry Mullis

Answer: B

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12. Biotechnology is

A. Application of biological organisms to study evolutionary changes

B. A science of producing organisms by culturing bacteria

C. Application of organisms to produce products useful to the mankind

D. All of the above

Answer: C

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13. A technique which involves deliberate manipulation of genes within or between species is called:

A. Gene therapy

B. Tissue culture

C. Hybridoma technology

D. Genetic engineering

Answer: D

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14. Construction of first recombinant DNA was done by using plasmid of

A. Salmonella typhimurium

B. Escherichia coli

C. Bacillus thuringiensis

D. Yeast

Answer: A

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15. Recombinant DNA or r DNA technology was discovered by

A. Khorana

B. Bateson and de Vries

C. Sutton and Avery

D. Cohen and Boyer

Answer: D

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16. Advancement in genetic engineering has been possible due to discovery of

A. Oncogenes

B. Transposons

C. Restriction endonucleases

D. Exonucleases

Answer: C

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17. Genetic engineering is :

A. Making artificial genes

B. Hybridisation of DNA

C. Making artificial limbs and diagnostic instruments

D. Production of alcohol by using microorganisms

Answer: B

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18. 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. Tissue culture

B. Genetic engineering

C. Biotechnology

D. Vernalisation

Answer: B

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19. Removal and insertion of genes is

A. Genetic engineering

B. Biotechnology

C. Gene therapy

D. Cytogenetics

Answer: A

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20. Genetic engineering is

A. Plastic surgery

B. Addition or removal of genes

C. Study of extra nuclear genes

D. All of the above

Answer: B

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Section A Topicwise Questions Topic 2 Tools Of Tecombinant Dna Technology Trestriction Enzymes

1. Among the following, select the tools of recombinant DNA technology

a. Restriction enzymes b. Polymerase enzymes

c. Ligases d. Vectors

e. Host organisms

A. a, b, c, d and e

B. a, c, d and e

C. a, b, c and d

D. a, b, c and e

Answer: A

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2. In the year ....a... the two enzymes responsible for ...b... the growth of bacteriophage in E. coli were isolated. One of

these added ..c... group to DNA, while other ...d... DNA. The later was called ...e...

A. a - 1963, b - promoting, c -ethyl, d-join, e-DNA ligase

B. a-1963, b-restricting, c-methyl, d-join, e-DNA ligase

C. a-1972, b-restricting, c-methyl, d-cut, e-restriction endonucleases

D. a-1963, b-restricting, c-methyl, d-cut, e-restriction endonuclease

Answer: D

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3. In restriction enzymes like EcoRI , the Roman numbers following the names indicate the:

A. Order in which the enzyme were discovered from that strain of bacteria

B. Order in which the enzyme were isolated from that strain of bacteria

C. Genus of the prokaryotic cell or bacteria

D. Strain of the bacteria

Answer: B

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4. EcoR I cut the DNA between the bases

A. G and T only

B. G and C only

C. A and T only

D. G and A only

Answer: D

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5. Type of sticky end produced by the action of the EcoRI is

A. GAATTC

B. CTTAA

C. AATTC

D. AATT

Answer: D

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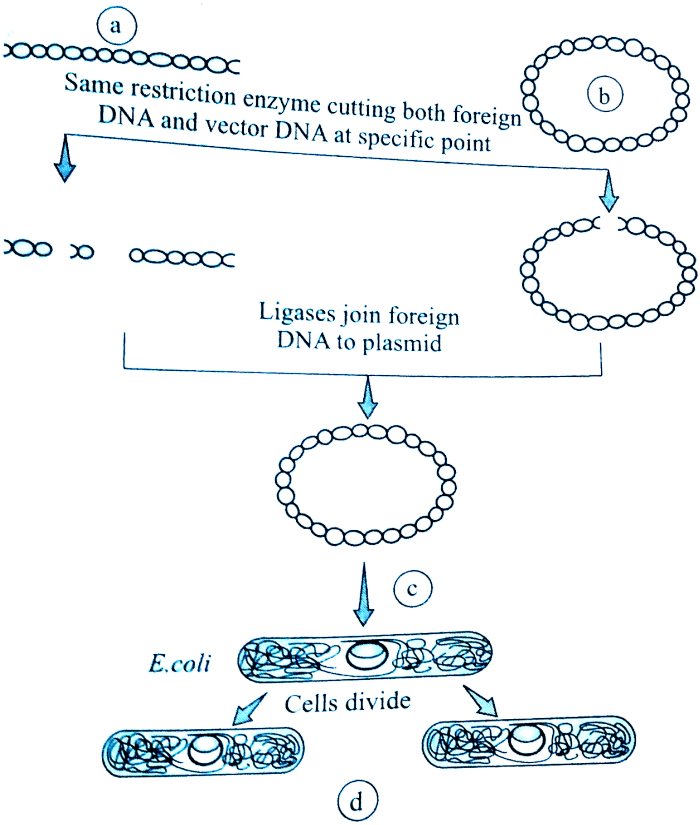
6. Recongnise the figure and find out the correct matching



A. a-foregin DNA, b-vector DNA, c-translation,, d-PCR

B. a-vector DNA, b-foregin DNA, c -transduction, d-electrophoresis

C. a-foreign DNA, b-vector DNA, c - transformation, d-rDNA techonology

D. a-vector DNA, b-foreign DNA, c-transformation, d-rDNA technology

Answer: C

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7. The most important feature in a plasmid to be used as a vector is

A. Origin of replication

B. Presence of sites for restriction endonuclease

C. Presence of selectable marker

D. Presence of alternate selectable marker

Answer: A

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8. In vecotr pBR 322, the 'rop' codes for th e

A. Pvu II

B. Pvu I

C. Proteins that involved in the replication of the restriction enzyme

D. Proteins that involved in the replication of th eplasmid

Answer: D

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9. Alternate selectable markers have ability to differentiate recombinants from non-recombinants due to the

A. Inactivation of the recombinants DNA

B. Inactivation of the enzyme $\beta -$ galactosidase

C. Insertional inactivation

D. Both B and C

Answer: D

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10. Which of the following features are required to facilitate cloning into a vector ?

a. Origin of replication (ori) b. Selectable marker c. Cloning site

A. a and b

B. b and c

C. a and c

D. a, b and c

Answer: D

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11. Which of the following are considered as useful selectable markers for E.coli ?

a. Ampicillin resistance gene

b. Chloramphenicol resistance gene

c. Tetrachcline resistance gene

d. Kanamycin resistance gene

A. a only

B. a and b

C. a, b and c

D. a, b, c and d

Answer: D

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12. The procedure through which a piece of DNA is introduced in a host bacterium is called

A. Translation

B. Transcription

C. Transformation

D. Translocation

Answer: C

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13. DNA is stained by

A. Ethidium dibromide

B. Ethidium bromide

C. Ethylene bromide

D. Methylene bromide

Answer: B

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14. Which is the palindromic nucleotide sequence ?

$$(i)\begin{matrix}\text{GAATTC}\\ \text{CTTAAG}\end{matrix} \quad (ii)\begin{matrix}\text{AGGCCT}\\ \text{TCCGGA}\end{matrix} \quad (iii)\begin{matrix}\text{CAGTCG}\\ \text{GTCAGC}\end{matrix}$$

A. i, ii and iii

B. i, and ii

C. i only

D. i and ii

Answer: A

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15. DNA fragments cut by restriction enzyme can be separated by

A. PCR

B. ELISA

C. Agarose gel electrophoresis

D. Downstream processing

Answer: C

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16. Read the following statements and find out the incorrect statements will reference to agarose gel electrophoresis

(i) Now-a-days the most commonly used matric

is agarose which is a synthetic polymer extracted from sea weeds

(ii) Large the frament size, the farther it moves

(iii) We can not see pure DNA in UV light without staining

(iv) DNA fragments separate (resolve) according to their size through sieving effect provided by the agarose gel

A. i, ii and iii

B. ii, iii and iv

C. iii and v

D. i and ii

Answer: D

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

A. Agrobacterium tumifaciens

B. Bacillus amyloliquefaciens

C. Haemophilus influenzae

D. Escherichia coli

Answer: A

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

A. Transformed cells

B. Non-transformed cells

C. Competent cells

D. Non-recombinant cells

Answer: A

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19. Which statement is incorrect regarding to restriction endonuclease enzyme ?

A. It belongs to the class of nucleases

B. It is isolated from virus

C. It recognises a palindromic nucleotide sequence

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

Answer: B

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20. Some foreign DNA fragment is attached to Cla I site of pBR 322. This recombinant vector in used to transform Escherichia coli. Then on

two different media, one containing ampicillin and the other containing tetracycline. The transformed cells containing the recombinant vecotr will

A. Grow on both, tetracycline and ampicillin containing media

B. Not grow on either tetracycline containing or ampicillin containing media

C. Grow on tetracycline but not on ampicillin containing medium

D. Grow on ampicillin but not on tetracycline containing medium

Answer: A

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21. Selective markers in plasmids are used to

A. Identifying cancer cells

B. Identifying antibiotics

C. Identifying recominants from non-recombinants

D. None of these

Answer: C

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

A. Endonucleases

B. Exonuclease

C. DNA ligase

D. DNA polymerase/Hind II/EcoR I

Answer: B

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23. BamH I site in present at

A. amp^R gene

B. tet^R gene

C. Ori

D. rop

Answer: B

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24. Selectable markers are present in

A. vector

B. Host

C. Antibiotic resistance gene

D. Antibiotics

Answer: A

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25. In pBR 322 amp^R and tet^R gene are present. When we ligate a foreign DNA at Pst-I site, then recombinant plasmids will lose the resistance to the

A. Ampicillin

B. Tetracycline

C. Both A and B

D. None of the above

Answer: A

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26. DNA staining by ethidium bromide is followed by the exposure to UV rays. Now DNA is seen as bands of

A. Blue colour

B. Orange colour

C. Red colour

D. Both B and C

Answer: B

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

A. Cloning sites

B. Ori

C. Restriction endonucleases

D. Insertional inactivation

Answer: B

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28. Restriction' in restriction enzyme refers to

A. Cutting of DNA at specific position only

B. Cleaving of phosphodiester linkage

C. Prevention of the multiplication of bacteriophage in bacteria

D. All of the above

Answer: C

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29. The role of DNA ligase in the construction of a recombinant DNA molecule is :

A. Formation of phosphodiester bond between two DNA fragments

B. Formation of hydrogen bonds between sticky ends of DNA fragments

C. Ligation of all purine and pyrimidine bases

D. All of the above

Answer: A

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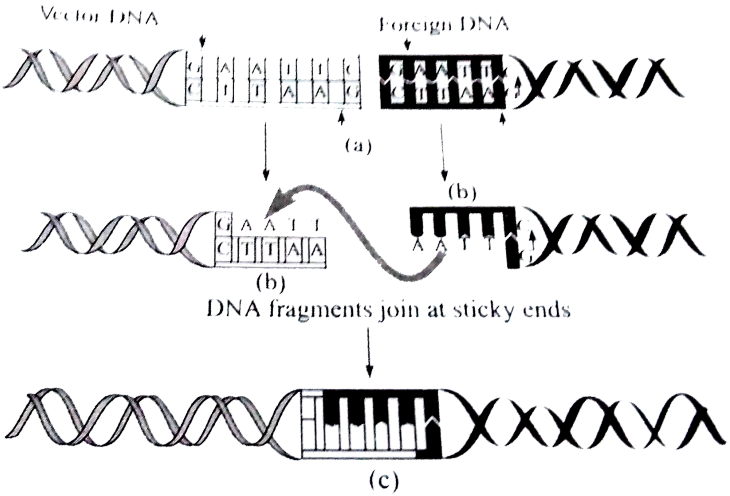
30. Recognise the figure and find out the correct matching



A. a-HindII, b -blunt end, c-non recombinant DNA

B. a-BamH I, b-sticky end, c-recombinant DNA

C. a-EcoR I, b-sticky end, c-non recombinant DNA

D. a-EcoR I, b-sticky end, c-recombinant DNA

Answer: D

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31. Genetic engineering has been made possible due to

A. Observation of DNA under electron microscope

B. We can break DNA at specific points by Dnases

C. Availability of restriction endonucleases in purified form

D. Knowledge of transduction

Answer: C

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32. Plasmids are used in genetic engineering because they are

A. Easily available

B. Able to replicate

C. Abe to integrate with host chromosome

D. Inert

Answer: B

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33. Which statement is incorrect

A. Recognition sequence is made up of 6 bases

B. Recognition sites are present in cloning vector

C. In gene-gun method, plant cell are bombarded with high velocity micro-particles of gold or tungsten

D. Agrobacterium tumifaciens is a pathogen of several dicot plants

Answer: A

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34. Which of the following is a plasmid ?

A. Hind II

B. pBR 322

C. EcoR I

D. Both A and C

Answer: B

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35. Genes for antibiotic resistance located in

Or

Bacterial resistance to antibiotics is a genetic trait, it is normally carried by the

A. Nucleus

B. Chromosome

C. Plasmid

D. Cell membrane

Answer: C

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36. When a recombinant dNA is inserted within the coding sequencing of an enzymes, β-galacttosidase

A. Recombinant colonies will produce blue colour in presence of chromogenic substrate

B. Non-recombinant colonies will produce blue colour in presence of chromogenic substrate

C. Non-recombinant colonies will not produce colour due to insetional inactivation

D. Both recombinant and non-recombinant colonies produce blue colour

Answer: B

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37. In the E.coli cloning vector pBR 322, the number of selectable marker is

A. 4

B. 1

C. 2

D. 3

Answer: C

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38. Due to difficulty in inactivation of antibiotics, alternate selectable markers developed to differentiate recombinants from non-recombinants on the basic of ability to

A. Produce bright orange colour in the prsence of a chromogenic substrate

B. Produce colour in the presence of a chromogenic substrate

C. Produce blue colour colonies due to insetional inactivation

D. All are correct

Answer: B

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39. After the fragmentation by restriction endonuclease enzyme, the fragments are separated according to their size, this is called

A. Agarose gel electrophoresis

B. PCR

C. Sieving effect

D. Spooling

Answer: A

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40. In a chromosome there is a specific DNA sequence which is responsible for initiating replication is

A. Palindromic nucleotide sequence

B. Ori

C. Promoter

D. rop

Answer: B

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41. The separated bands of DNA are cut out from the agarose gel and extracted from the gel piece. This step is called

A. Electrophoresis

B. Resolution

C. Elution

D. Spooling

Answer: C

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42. Restriction enzymes belong to a larger class of the enzyme called

A. Cellulase

B. Nuclease

C. Chitinase

D. Polymerase

Answer: B

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43. In pBR 322, how many recognition sites are present ?

A. 8

B. 7

C. 3

D. 4

Answer: A

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44. Presence of more than one recognition sites within the vector will

A. Facilitates the gene cloning

B. Facilitates the action of DNA ligase

C. Facilitates the action of restriction enzyme

D. Complicate the gene cloning

Answer: D

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45. The stickiness of DNA ends faciliates the action of which enzyme

A. Action of DNA ligase and these ends joined to gether laterally

B. Action of DNA ligase and these ends joined together end-to-end

C. Action of Taq polymerase

D. Action of restriction enzyme

Answer: B

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46. Ori is the some specific sequence in the vecotr pBR 322. Ori also has the recongnition sequence for the restriction enzyme

A. Pst I

B. Pvu II

C. Hind III

D. None of the above

Answer: D

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47. In pBR 322, recognition segqences, that are present on the same type of selectable marker

A. Pst I, Pvu I

B. Bam HI, Sal I

C. Both A and B

D. None of the above

Answer: C

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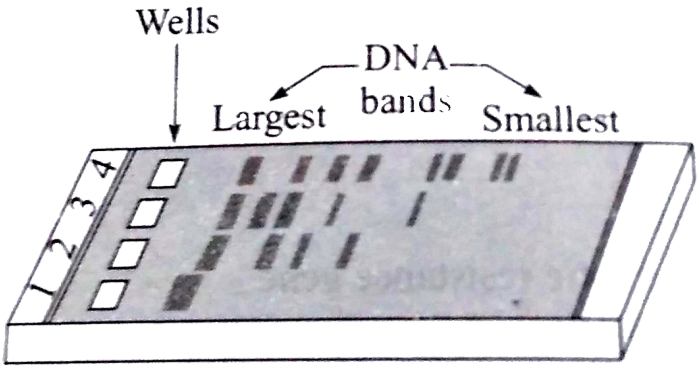
48. The following figure shows



A. Ploymerase chain reaction

B. Agarose gel electrophoresis

C. Downstream processing

D. Biolistics or gene gun

Answer: B

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49. Restriction endonucleases used widely in RDT are obtained from

A. Plasmids

B. Bacterial cells

C. Bacteriophages

D. All prokaryotic cells

Answer: B

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50. Construction of recombinant DNA involves

A. Cleaving and rejoining of DNA segments with endonuclease

B. Cleaving DNA segments with endonuclease and rejoining with ligase

C. Cleaving and rejoining DNA segments with ligase

D. Cleaving DNA segments with ligase and rejoining with endonuclease

Answer: B

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51. Identify the vector suitable for cloning long DNA fragments

A. Phage vector

B. Bacterial plasmid

C. Yeast plasmid

D. Cosmids

Answer: D

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52. Nucleic acid is fragmented by enzyme

A. Ligases

B. Proteases

C. Nucleases

D. Polymerases

Answer: C

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53. Tumor inducing (Ti) plasmid transforms :

A. Animals

B. Plants

C. Bacteria

D. Fungi

Answer: B

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54. Restriction endonucleases are

A. Used in genetic engineering for uniting two DNA molecules

B. Used for in vitro DNA synthesis

C. Present in mammalian cells for degeneration of DNA of dead cells

D. Synthesised by bacteria for their defence

Answer: D

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55. Plasmids are used as vectors in genetic engineering because of their

A. Resistance to antibiotics

B. Resistance to restriction enzymes

C. Ability to carry foreign genes

D. Ability to casue infection in host

Answer: C

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Section A Topicwise Questions Topic 3 Processes Of Recombinant Dna Technology Isolation Of The G

1. A recombinant DNA molecule can be produced in the absence of the followingt :

A. Restriction endonucleases

B. DNA ligase

C. DNA fragments

D. E. coli

Answer: D

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2. Find the correct match for the breaking of the cell wall during isolation of genetic material in rDNA procedure

A. Cellulase -Plant cell

B. Lysozyme-Fungus

C. Chitinase-Bacteria

D. All of the above

Answer: A

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3. Recombinant DNA technology involves several steps in specific sequence. Find out the correct sequence.

a. Fragmentation of DNA

b. Culturing the host cells in a medium at large scale

c. Ligation of DNA fragment into a vector

d. Extraction of the desired product

e. Isolation of DNA

f. Isolation of desired DNA fragment

g. Transferring the recombinaut DNA into the host

A. $e \rightarrow a \rightarrow f \rightarrow g \rightarrow c \rightarrow b \rightarrow d$

B. $e \rightarrow f \rightarrow a \rightarrow c \rightarrow g \rightarrow b \rightarrow d$

C. $a \rightarrow e \rightarrow c \rightarrow f \rightarrow g \rightarrow d \rightarrow b$

D. $e \rightarrow a \rightarrow f \rightarrow c \rightarrow g \rightarrow b \rightarrow d$

Answer: D

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

A. Ribonuclease

B. Deoxyribonuclease

C. Lysozyme

D. Protease

Answer: B

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5. When the chilled ethanol is added in purified DNA, it ultimately precipitates out. The can be show in the figure as collection of

fine threads in the suspension. This process is known as

A. Electorphoresis

B. Downstream processing

C. PCR

D. Spooling

Answer: D

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Section A

1. The following figure shows:

A. Elution

B. Spooling

C. Biloistics

D. Downstream processing

Answer: B

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Section A Topicwise Questions Topic 4 Amplification Of Gene Of Interest Using Pcr Insertion Of R

1. Thermal cycle is used in

A. Radioactivation

B. Chemical reaction

C. Polymerase chain reaction

D. Exzyme catalysed reactions

Answer: C

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2. In PCR, DNA is amplified about 10^9 times, when cycle is repeated by

A. 30 times

B. 1 times

C. 1 billion times

D. 1 million times

Answer: A

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3. DNA is a ..1.. molecule having ....2.. charge

A. 1-Hydrophobic, 2-negative

B. 1-Hydrophilic, 2-positive

C. 1-Hydrophilic, 2-negative

D. 1-Hydrophobic, 2-positive

Answer: C

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4. Which is used for the introduction of alien DNA into the animals cell ?

A. Agrobacterium tumifaciens

B. Retroviruses

C. Biolistics method

D. Both B and C

Answer: B

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

A. Ti plasmid

B. Retrovirus

C. E.coli

D. Both A and B

Answer: D

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6. Which is used as a cloning vecotr into plants ?

A. Micro-injection

B. Retroviruses

C. Ti plasmid

D. Both A and B

Answer: C

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7. Which of the following statements is/are correct about heat shock

A. Given at $42^{\circ} C$

B. A step of the process that enables linking of alien DNA to the plasmid

C. A step of the process that enables introduction of alien DNA into the host cells

D. Both A and C

Answer: D

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

A. Annealing of primers to template DNA

B. Denaturating of template DNA

C. Extension of primer on the template DNA

D. All of the above

Answer: C

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9. Significance of 'heat shock' method in bacterial transformation is to facilitate:

A. Expression of the antibiotic resistance gene in the vector

B. Ligation of DNA to the cell membrane

C. Uptake the DNA through membrane transport protein

D. Uptake of DNA through pores in the bacterial cell wall

Answer: C

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10. Small chemically synthesised oligonucleotides that are complementary to

the regions of DNA are called primers and present at the ....

A. 5' end

B. 3' end

C. Both 3' and 5' end

D. None of the above

Answer: B

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11. Which of the following has popularised the PCR ?

A. Availability of Taq polymerase which is thermally stable

B. Availability of deoxyribonucleotides

C. Availability of synthetic primers

D. All of the above

Answer: A

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12. Select the correct statement(s)

A. If any protein encoding gene is expressed in a homologous host, it is called a recombinant proteins

B. In PCR, the multiple copies of gene of interest is synthesised in vitro using one set of primers

C. A thermostable enzyme (Taq polymerase) is obtained from

cyanobacterium Thermus aquaticus

D. None of the above

Answer: D

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13. Select the correct statement(s)

A. Agarose gel electrophoresis is used to check the progression of a restriction enzyme digestion

B. DNA is negative charged and lipophilic in nature,

C. Agrobacterium and Retrovirus both transforms normal animal cells into cancerous cells

D. Both A and C

Answer: A

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14. Read the following statements

(i) Primers used in PCR are small chemically synthesised oligosaccharides

(ii) E. coli is closely related to Salmonella

(iii) There are 3 basic steps in genetically modifying an organism

(iv) The techniques of the genetic engineering overcome the limitation of traditional hybridisation procedures.

In these statements how many are correct

A. 4

B. 3

C. 1

D. 2

Answer: B

15. DNA polymerase enzyme used in PCR is isolated from

A. Thermus aquaticus

B. E.coli

C. Salmonella typhimurium

D. None of the above

Answer: A

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16. Thermostable enzymes 'Taq and Pfu' isolated from thermophilic bacteria are

A. DNA polymerases

B. DNA ligase

C. Restriction endonucleases

D. RNA polymerases

Answer: A

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17. Which is correctly matched?

A. Agrobacterium tumifaciens - Tumour

B. pBR 322 -Enzyme

C. Thermus aguaticus -Bt gene

D. Ligase -Molecular scissors

Answer: A

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18. Gene amplification using primers can be done by :

A. Microinjection

B. ELISA

C. Polymerase chain reaction

D. Gene gun

Answer: C

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

A. Denaturation, synthesis, annealing

B. Annealing, synthesis, denaturation

C. Synthesis, annealing, denaturation

D. Denaturation, annealing, synthesis

Answer: D

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20. Enzyme required for polymerase chain reaction (PCR) is

A. RNA polymerase

B. Ribonuclease

C. Taq polymerase

D. Endonuclease

Answer: C

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21. PCR technique was invented by

A. Boyer

B. Karry Mullis

C. Cohn

D. Sanger

Answer: B

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22. The source of Taq polymerase used in PCR is a :

A. Thermophilic fungus

B. Meophilic fungus

C. Themophilic bacterium

D. Halophilic bacterium

Answer: C

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23. Polymerase chain reaction employ

A. Primers and DNA ligase

B. DNA ligase only

C. DNA polymerase only

D. Primers and DNA polymerase

Answer: D

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24. Polymerase chain reaction is most useful in

A. RNA synthesis

B. DNA amplification

C. Protein synthesis

D. Amino acid synthesis

Answer: B

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Section A Topicwise Questions Topic 5 Obtaining The Foreign Gene Product Downstream Processing

1. Which is correct regarding genetically engineered insulin using E.coli ?

A. Difficulty in purifying the product

B. Obtained in large unlimited quantities

C. Possibility of transmission of animal diseases

D. Insulin obtained varies in chemical structure

Answer: B

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2. Bioreactors are useful in

A. Separation and purification of a product

B. Microinjection

C. Processing of large volume of culture

D. Isolation of genetic material

Answer: C

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3. A typical bioreactor has

a. An agitator system

b. An oxygen control delivery system

c. A foam control system

d. A temperature control system

e. A pH control system

f. Sampling ports

A. a, b and c

B. a, b, c and d

C. a, b, b, d and c

D. a, b, c,d,e and f

Answer: D

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4. After the biosynthetic phase, the product is separated and purified by the process called

A. Agarose gel electrophoresis

B. PCR

C. Downstream processing

D. Insertional inactivation

Answer: C

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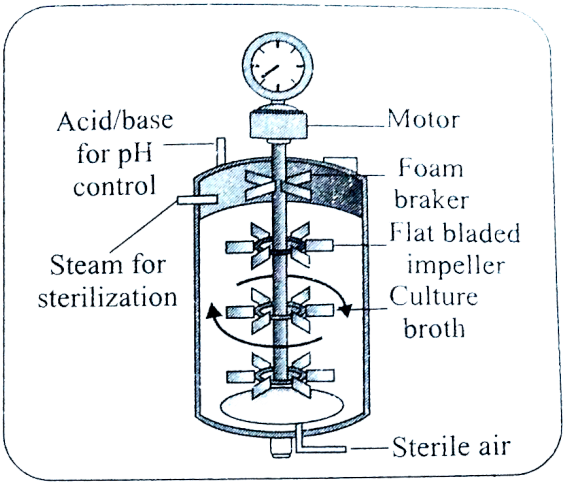
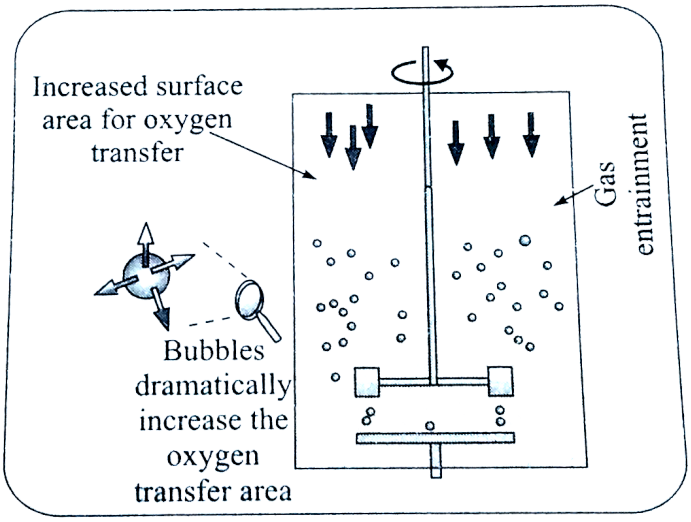
5. Recongnise the figure and find out the correct matching



(a)



(b)

A. a-simple stirred tank bioreaction, b-complex stirred tank bioreactor

B. a-complex stirred tank bioreactor, b-simple stirred tank bioreactor

C. a-simple stirred tank bioreactor, b-sparged stirred tank bioreactor

D. a-sparged stirred tank bioreactor, b-simple stirred tank bioreaction

Answer: C

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6. For large scale production of recombinant product the most commonly used bioreactor are of

A. Simple type

B. Stirring type

C. Both A and B

D. None of the above

Answer: B

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7. Which of the following should be chosen for best yield if one were to produce a recmobinant protein in large amounts ?

A. A continuous culture system

B. A laboratory flask of large capacity

C. A bioreactor without ports

D. Any of the above

Answer: A

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8. Stirred-tank reactor is usually cylindrical or with a curved base. Why?

A. Mixing of the reactor contents

B. Control the temperautre of the reactor

C. Control the pH of the reactor

D. All of the above

Answer: A

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9. Select the incorrect statements(s)

A. A foreign DNA can be ligated at the BamHI site of ampicillin resistance gene in the vector pBR 322

B. Some plasmids may have only one or 2 copies per cell wheras others may have 15-100 copies per cell.

C. In almost all recombinant technologies, the ultimate aim is to produce a desirable proteins

D. All of the above

Answer: A

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Section B Assertion Reasoning Questions

1. Assertion : Making curd, bread or wine, which are all microbe mediated processes, could be thought as a form of biotechnology.

Reason :Biotechnology refers to such fo those processes which use genetically modified organisms to achieve the same on a large scale

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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2. Assertion : Asexual reproduction preserves the genetic information, while sexual reproduction permits variation

Reason :Sexual reproduction provides opportunities for formulation of unique combination of genetic setup, some of which may be beneficial to the organism as well as the population

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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3. Assertion : Traditional hybridisation procedures used in plant and animal breeding, very often lead to inclusion and multiplication of underirable genes along with the desired genes.

Reason :The techniques of genetic engineering overcome this limitation and allows us to isolate and introduce only one or a set of desirable genes without introducing undersirable genes into the target organis

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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4. Assertion : If any piece of DNA is somehow transferred into an alien organism,, most likely, this piece of DNA would not be able to multiple itself in the progeny cells of the organism

Reason :For the multiplication of any alien piece of DNA in an organism it needs to be a part of a chromosome (s) which has a specific sequence known as origin of replication.

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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5. Assertion : The first restriction endonuclease was Hine II

Reason :Hind II always cut DNA molecules at a particular point by recongnising a specific sequence of six base pairs.

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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6. Assertion : Besides HindII, today we know more than 900 restriction enzymes that have been isolated from over 230 strains of bacteria Reason :Each restriction enzyme recognises different recognition sequence

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

B. If both assertion and reason are true but reason is not the correct explanation of

the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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7. Assertion : The convention for naming restriction enzymes is the first letter of the name comes from the genes and the second two letters come from the species of the

prokaryotic cell from which they were isolated

Reason: In EcoRI, the later 'R' is derived from the order

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: D

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8. Assertion : Nucleases enzymes are of two kinds, exonucleases and endonucleases.

Reason: Endonucleases remove nucleotides from the ends of the DNA

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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9. Assertion : Each restriction endonuclease funtions by 'inspecting' the length of a DNA sequence

Reason:Once it finds its specific recognition sequence, it will bind to the DNA and cut hydrogen bonds

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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10. Assertion: Each restriction endonuclease recognises a specific pallindromic nucleotide sequence in the DNA

Reason :The pallindrome in DNA is a sequence of base pairs that reads same on the two strands in a particular direction

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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11. Assertion : Restriction enzymes cut the strand of DNA a little away from the centre of the palindromic sites

Reason: Restriction enzymes cut the strads of DNA between the same two bases on the opposite strand.

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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12. Assertion : Unless one cuts the vector and the foreign/source DNA with the same restriction enzymes, the recombinant vector molecule cannot be created

Reason: When cut by the same restriction enzyme, the resultant DNA fragments have the same kind of sticky ends and these can be joined together (end to end) using DNA ligases

A. If both assertion and reason are true and the reason is the correct

explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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13. Assertion : In gel electrophoresis, DNA fragments can be separated by forcing them to move twoards the cathode under the electric field through a matrix/medium

Reason: DNA fragments are positively charged.

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

B. If both assertion and reason are true but reason is not the correct explanation of

the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: D

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14. Assertion : If one wants to recover many copies of the target DNA it should be cloned in a vector whose origin support high copy number

Reason: Ori is responsible for controlling the copy number of the linked DNA/target DNA

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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15. Assertion : Selectrable markers helps in identifying and eliminating non-transformants and selectively permitting the growth of transformants

Reason: If a recombinant DNA bearing gene for resistance to ampicillin is transferred into E.coli cells, the host cells become transformed into ampicillin-resistant cells

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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16. Assertion : During transformation, in order to force bacteria to take up the plasmid, the bacterial cell must first be made 'competent' to take up DNA

Reason: This is done by treating them with a specific concentration of a monovalent cation such as sodim

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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17. Assertion : Nucleic acid is the genetic material of all organisms without exception

Reason: During isolation of genetic material ribonucleases and proteases are used.

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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18. Assertion : A large scale production of product involves use of bioreactions

Reason: Drugs has to undergo through clinical trials before marketing

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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19. Assertion : Restriction enzyme cuts both vector DNA and foreign DNA at the same site

Reason: Both plasmid and bacteriophages have the ability to replicate within bacterial cells independent of the control of chromosomal DNA

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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Section D Chapter End Test

1. Plasmids are vectors for gene cloning because they

A. Self replicate in bacterial cells

B. Replicate freely outside bacterial cells

C. Can be multiplied in culture

D. Can be multiplied in laboratories using enzymes

Answer: A

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2. Cloning is means to

A. Replace original genotype

B. Preserve genotype

C. Production of HGH gene in Escherichia coli

D. None of the above

Answer: B

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3. Two bacteria most useful in genetic engineering are

A. Rhizobium and Azotobacter

B. Escherichia and Agrobacterium

C. Rhizobium and Diplococcus

D. Nitrosomonase and Klebsiella

Answer: B

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4. Bacterial plasmid contains

A. RNA

B. RNA + protein

C. DNA

D. Photosynthetic structures

Answer: C

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5. A good vector in genetic engineering is

A. Agrobacterium tumifaciens

B. Bacillus thuringiensis

C. Bacillus amyloliquefaciens

D. Salmonella typhimurium

Answer: A

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6. The techniques of insertion of a desired gene into DNA of plasmid vector is

A. Gene splicing

B. Gene dressing

C. Gene cloningg

D. Gene drafting

Answer: A

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7. A plasmid

A. Lives together with chromosomes

B. Shows dependent assortment

C. Can replicate independently

D. Cannot replicate

Answer: C

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8. With the help of DNA ligase donor DNA fragment is joined. It is called

A. Molecular cloning

B. Tissue culture

C. Protoplasmic fusion

D. Splicing

Answer: D

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9. Advancement in genetic engineering has been possible due to discovery of

A. Transposons

B. Endonucleases

C. Exonucleases

D. Oncogenes

Answer: B

 Watch Video Solution

10. Restriction endonucleases are useful in

A. Breaking DNA at specific sites

B. Creating sticky ends

C. Both A and B

D. Crossing over

Answer: C

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11. Endonuclease in employed in

A. Transcription

B. Translation

C. Genetic engineering

D. DNA replication

Answer: C

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12. The enzyme which are commonly used in genetic engineering are

A. Restriction endonucleases and polymerase

B. Endonucleases and ligase

C. Restriction endonculease and ligase

D. Ligase and polymerase

Answer: C

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13. Natural genetic engineer is

A. Pseudomonas putida

B. Agrobacterium tumifaciens

C. Escherichia coli

D. Bacillus subtilis

Answer: B

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14. Genomic DNA library is

A. Packing of donor DNA in a collection of vectors

B. A collection of gene vectors

C. Collection of organisms for extracting DNA

D. A collection of literature about DNA

Answer: A

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

A. Endonculease

B. Exonuclease

C. Gyrase

D. Ligase

Answer: A

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16. In plant biotechnology, root tumours are induced by

A. Rhizobium

B. Agrobacterium tumifaciens

C. Agrobacterium rhizogenes

D. Agrobacterium basilis

Answer: C

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17. Restriction endonucleases are called so as they

A. Synthesize DNA

B. Restrict nuclear activity

C. Cleave DNA into fragments

D. Break DNA at random

Answer: C

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18. Select DNA sequence which would act as a restrictions site

A. $\frac{\mathrm{AACCGG}}{\mathrm{TTGGCC}}$

B. $\frac{\mathrm{GGTTGG}}{\mathrm{CCAACC}}$

C. $\frac{\mathrm{AAGGCT}}{\mathrm{TTCCGA}}$

D. $\frac{\mathrm{CTGCAG}}{\mathrm{GACGTC}}$

Answer: D

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19. Extrachromosomal DNA used as vector in gene cloning is

A. Transposons

B. Intron

C. Exon

D. Plasmid

Answer: D

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20. Electroporation is

A. Making transient pores in cell membranes to introduce gene constructs

B. Fast passage of nutrients through phloem sieve proves by electric stimulation

C. Opening of stomata by artificial light during night

D. Purification of saline water with the help of menbrane system

Answer: A

21. Which enzyme is usedful in genetic engineering ?

A. DNase

B. Amylase

C. Lipase

D. Restriction endonuclease

Answer: D

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22. Restriction enzymes are used in genetic engineering because they

A. Can join DNA fragments

B. Cut DNA at specific base sequence

C. Cut DNA at variable sites

D. Are proteolytic enzymes which degrade harmful proteins

Answer: B

23. Insect tolerant gene from Bacillus thuringiensis is introduced using Ti plasmid of

A. Escherichia coli

B. Agrobacterium tumifaciens

C. Haemophilus influenzae

D. Arabidopsis thaliana

Answer: B

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24. GAATTC is recognition site of restriction endonuclease

A. HindIII

B. EcoRI

C. BamI

D. HaeIII

Answer: B

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25. Restriction endonuclease is employed for cutting

A. A single stranded DNA

B. Double stranded DNA

C. RNA fragment

D. mRNA

Answer: B

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26. Restriction enzyme (s) of recombinant DNA technology that make staggered cuts leaving stickly ends is/are

A. EcoRI

B. HindIII

C. BamHI

D. All of the above

Answer: D

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27. Cohen and Boyer isolated an antibiotic resistance gene, by cutting out a piece of DNA

from a plasmid which was responsible for conferring antibiotic resistance, in the year

A. 1963

B. 1967

C. 1972

D. 1982

Answer: C

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28. Amplification of gene of interest by using DNA polymerase may go upto

A. 0.1 million times

B. 1.0 million times

C. 1.0 billion times

D. 1.0 trillion times

Answer: C

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29. Enzymes necessary for recombinant DNA technology are

A. Endonculeases and polymerases

B. Restriction endonculeases and ligases

C. Peptidases and ligases

D. Restriction endonculeases and topoisomerases

Answer: B

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30. Read a and b and identify correct choice Statement a. Agrobacterium tumefaciens causes crown gall in dicots Statement b. Agrobacterium tumefaciens enters host through wound and injuries

A. b is correct, a is wrong

B. Both a and b are correct

C. both a and b are wrong

D. a is correct, b is wrong

Answer: B

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31. In genetic engineering , restriction enzymes are used for cutting

A. Bacterial DNA only

B. Eukaryotic DNA

C. Viral DNA

D. Any DNA fragment

Answer: D

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32. Melting of DNA at $70^{\circ}C$ is due to breakdown of

A. Phosphodiester bonds

B. Hydrogen bonds

C. Glycosidic bonds

D. Disulphide bonds

Answer: B

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33. Fragments of DNA formed after treatment with endonucleases are separated by the technique

A. Polymerase chain reaction

B. Southern blotting

C. Colony hybridisation

D. Electrophoresis

Answer: D

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34. Plasmids are suitable vectors for gene cloning because they are

A. Small circular DNA molecules with their own origin of replication site

B. Small circular DNA molecules which can integrate with host chromosmal DNA

C. Having antibiotic genes

D. Able to shuttle between prokaryotic and eukaryotic cells

Answer: A

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35. Identify the plasmid

A. EcoRI

B. pBR 322

C. Hind III

D. All of the above

Answer: B

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36. Autonomously replicating circular extrachromosomal DNA is called

A. Chromatin

B. Plasmid

C. Palindromic nucleotide sequence

D. Nucleoid

Answer: B

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37. In recombinant DNA technology, the term vector refers to

A. Plasmid that can transfer foreign DNA

B. Consmids 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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38. Vector for T-DNA is

A. Salmonella typhimurium

B. Thermus aquaticus

C. Agrobacterium tumifaciens

D. Escherichia coli

Answer: C

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39. What is true of plasmid

A. Found in viruses

B. Constains genes for vital activities

C. Part of nuclear chromosome

D. Widely used in gene transfer

Answer: D

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40. T_1 plasmid is used for making transgenic plants. It is obtained from

A. Azotobacter

B. Agrobacterium

C. Rhizobium in leguminous root

D. Yeast

Answer: B

Watch Video Solution

41. Tumour inducing plasmid used in producing transgenic plants is that of

A. Escherichia coli

B. Bacillus thuringiensis

C. Agrobacterium tumifaciens

D. Staphylococcus aureus

Answer: C

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42. In gel electrophoresis, differential mobility of DNA depends upon

A. Helical natural of DNA

B. Double stranded natural of DNA

C. Charge and size of DNA

D. Hydrogen bonding between bases

Answer: C

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43. Restriction enzymes are also called

A. Molecular markers

B. Vectors

C. Carriers

D. Molecular scissors

Answer: D

Watch Video Solution

44. The chemical knives of DNA are

Or Enzyme that cleaves nucleic acids within the polynucleootide chain is known as

A. Restriction endonucleases

B. Polymerases

C. Ligases

D. Transcriptases

Answer: A

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

A. $5'....GATATG....3'$
$3'....CTACTA....5'$

B. $5'....GAATTC....3'$
$3'....CTTAAG....5'$

C. $5'....CACGTA....3'$
$3'....CTCAGT....5'$

D. $5'....CGTTCG....3'$
$3'....ATGGTA....5'$

Answer: B

Watch Video Solution

46. The enzyme capable of cutting DNA molecule at specific sites is

A. Nuclease

B. Restriction endonculease

C. Lipase

D. Ligase

Answer: B

 Watch Video Solution

47. Biolistic technique is used in :

A. Tissue culture process

B. Hybridisation process

C. Germplasm conservation process

D. Gene transfer process

Answer: D

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48. The ends of DNA fragments are stickly due to

A. Unpaired bases

B. Free methylation

C. Endonulcease

D. Calcium ions

Answer: A

Watch Video Solution

Watch Video Solution

49. Recombinant DNA bearing ampicillin resistance gene is passed in E. coli. The latter are spread on agar plates containing ampicillin. Then

A. Both transformed and untransformed cells die

B. both transformed and untransformed cells grow

C. Transformed recipient cells grow and untrasformaed cells die

D. Transformed recipient cell die and untransformed cells grow

Answer: C

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50. The most extensively used bacteria in genetic engineering is

A. Bacillus

B. Clostridium

C. Escherichia

D. Salmonella

Answer: C

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Others

1. Gel electrophoresis is used for

A. Construction of recombinant DNA by joining with cloning vectors

B. Isolation of DNA molecules

C. Cutting of DNA into fragments

D. Separation of DNA fragment according to their size

Answer: D

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2. Bacterium commonly used in plant genetic engineering is

A. Agrobacterium

B. Corynebacterium

C. Bacillus subtilis

D. Salmonella typhi

Answer: A

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3. Which is used in gene cloning ?

A. Lomasomes

B. Mesosomes

C. Plasmid

D. Nucleotides

Answer: C

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4. Which can be used as vector for transfer of DNA segment

(a). bacterium (b). Plasmid (c) plasmodium (d) bacteriophage

A. a, b and d

B. a only

C. a and c

D. b and d

Answer: D

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

A. Salmonella typhimurium

B. Rhizopus nigricans

C. Retrovirus

D. Baculovirus

Answer: C

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6. Stirred-tank bioreactors have been designed for

A. Purification of the product

B. Ensuring anaerobic conditions in the culture vessel

C. Availability of oxygen throughout the process

D. Addition of preservatives to the product

Answer: C

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7. The is a restriction endonuclease called EcoRI. What does 'co' part of it stand for ?

A. Coenzyme

B. coli

C. Colon

D. Coelom

Answer: B

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8. Agarose extracted from sea weeds finds use in

A. PCR

B. Gel electrophoresis

C. Spectrophotometry

D. Tissue culture

Answer: B

Watch Video Solution

9. Which technique made it possible to genetically engineer living organisms ?

A. Recombinant DNA techniques

B. Heavy isotope labelling

C. X-ray diffraction

D. Hybridisation

Answer: A

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10. What is the source of EcoRI ?

A. Escherichia coli RI

B. Escherichia coli RI 13

C. Escherichia coli RX 13

D. Escherichia coli RY 13

Answer: D

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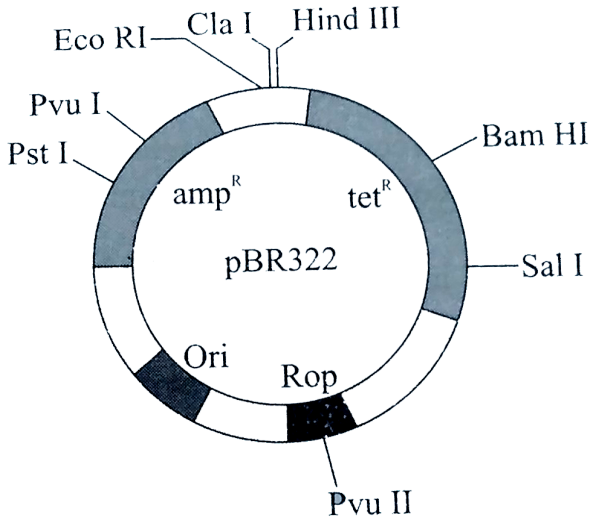
11. In the diagram of pBR 322, which identifies components correctly ?



A. rop-reduced osmotic pressure

B. Hind III, EcoRI-selectable markers

C. amp^R, tet^R- antibiotic resistance genes

D. ori-original restriction enzymes

Answer: C

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12. What is true about DNA polymerase used in PCR ?

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

B. It serves as selectable marker

C. It is isolated from a virus

D. It is active at high temperature

Answer: D

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13. Microparticles for coating with DNA to be bomarded with gene gun are made of

A. Silver or platinum

B. Platinum or zinc

C. Silicon or platinum

D. Gold or tungsten

Answer: D

Watch Video Solution

14. Biolistic gun is suitable for

A. Transformation of plant cells

B. Disarming pathogen vectors

C. DNA finger printing

D. Constructing recombinant DNA

Answer: A

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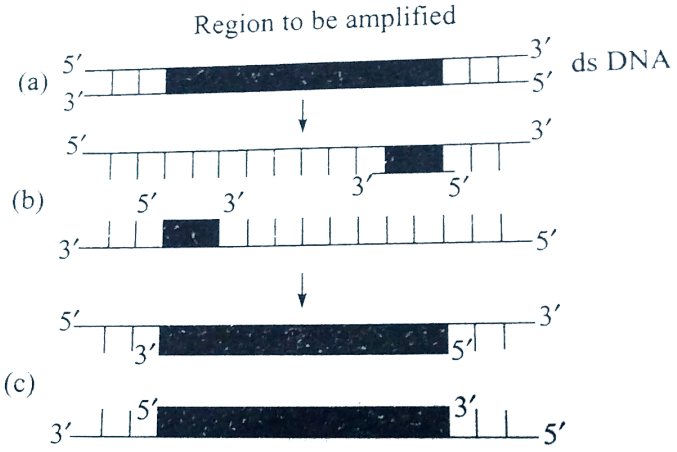
15. In the three step (a,b,c) of polymerase chain reaction, select the correct step



A. c-extension in presence of heat stable DNA polymerase

B. a-annealing with two sets of primers

C. b-denaturation at high temperature

D. a-denaturation at $50^{\circ} C$

Answer: A

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16. In genetic engineering antibiotics are used

A. For keeping cultures free of infection

B. To select healthy vectors

C. As selectable markers

D. As sequences where replication starts

Answer: C

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

A. Insertional inactivation of alpha galactosidase in recombinant bacteria

B. Inactivation of glycosidase enzyme in recombinant bacteria

C. Non-recombinant bacteria containing beta galactosidase

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

Answer: C

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18. DNA fragment 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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19. Which of the following is not correctly matched for the organisms 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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20. Eco RI cleaves the DNA strands to produce

A. Blunt ends

B. Sticky ends

C. Satellite ends

D. Ori replication end

Answer: B

Watch Video Solution

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

A. Precipitate DNA

B. Break open the cell to relase DNA

C. Facilitates action of restriction enzymes

D. Remove proteins such as histones

Answer: A

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22. During amplification of gene using PCR, Tap polymerase is used between

A. Denaturation and annealing

B. Annealing and extension

C. Annealing and amplification

D. None of the above

Answer: B

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23. Which of the following is a cloning vector ?

A. DNA of Salmonella typhimurium

B. Ti plasmid

C. Any DNA containing antibiotic resistance genes

D. Ori minus pBR 322

Answer: B

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24. Which of the following is a palindromic sequence ?

A. 5'-CGTATG-3'

3'-GCATAC-5'

B. `5'-CGAATG-3'

3'-CGAATG-5'

C. 5'-GAATTC-3'

3'-CTTAAG-5'

D. 5'-GACTAC-3'

3'-TACGAC-5'

Answer: C

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25. The restriction enzymes are used in genetic engineering because

A. They can cut DNA at specific base sequence

B. They are nucleases that cut DNA at variable sites

C. They can degrade harmful proteins

D. They can join different DNA fragments

Answer: A

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

A. Cosmid

B. Bacterial artifical chromosome

C. Yeast artifical chromosome

D. Plasmid

Answer: D

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27. The terms 'microinjection' , 'biolistics' and 'disarmed plathogen vector' are related to

A. Bioterrorism

B. Biosafety

C. Integrated pest management

D. Recombinant DNA technology

Answer: D

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28. Recombinant DNA technology revolution actually began with the discovery of

A. Plasmids

B. Restriction endonculeases

C. Complementary DNA

D. PCR

Answer: B

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29. Bioreactor is a vessel/device in which

A. Chemical process involving microorganisms is carried out

B. Chemical process involving radioactive substance is carried out

C. Potentially hazardous microbes are handled

D. Electrochemical processes are carried out

Answer: A

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30. Which of the following is not correctly matched for the organsim 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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31. Restriction enzymes are used in genetic engineering because

A. They can join different DNA fragments

B. They can cleave DNA at a specific target

C. They are nucleases that cut DNA at variable sites

D. They are proteolytic enzymes which can degrade harmful enzymes

Answer: B

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32. The toxic protein produced by the Bacillus thuringiensis

A. Cry-protein

B. Auxinus

C. Leg-haemoglobin

D. Opines

Answer: A

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

A. vector

B. Template

C. Carrier

D. Transformer

Answer: A

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34. The introduction of T-DNA into plants involves

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

B. Exposing the plants to cold for a brief period

C. Allowing the plant roots to stand in water

D. Infection of the plant by Agrobacterium tumifaciens

Answer: D

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

A. Probes

B. Selectabel markers

C. Ligases

D. Restriction enzymes

Answer: D

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36. Isolation of DNA from a fungal cell involves the use of enzyme

A. Chitinase

B. Lysozyme

C. Eco RI

D. Hind -II

Answer: A

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

A. Transferable

B. Single -stranded

C. Independent replication

D. Circular structure

Answer: B

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38. Which of the following is a restriction endonuclease ?

A. DNase I

B. RNase

C. Hind II

D. Protease

Answer: C

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39. Stirred-tank bioreactors have been designed for

A. Availability of oxygen throughout the process

B. Ensuring anaerobic conditions in the culture vessel

C. Purification of product

D. Addition of preservatives to the product

Answer: B

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

A. Polymerase III

B. Ligase

C. Eco RI

D. Taq polymerase

Answer: B

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41. Which of the following is not a component of down stream processing ?

A. Preservation

B. Expression

C. Separation

D. Purification

Answer: B

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42. Which of the following restriction enzymes produces blunt ends ?

A. Xho I

B. Hind III

C. Sal I

D. Eco RV

Answer: D

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

A. Acetocarmine

B. Aniline blue

C. Ethidium bromide

D. Bromophenol blue

Answer: C

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

A. Downstream processing

B. Bioprocessing

C. Postproduction processing

D. Upstream processing

Answer: A

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

A. vector

B. Plasmid

C. Structural gene

D. Selectable marker

Answer: D

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

A. The smaller than fragment size, the farther it moves

B. Positively charged fragments move to farther end

C. Negatively charged fragments do not move

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

Answer: A

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

A. Extension, Denaturation, Annealing

B. Annealing, Extension, Denaturation

C. Denaturation, Extension, Annealing

D. Denaturation, Annealing, Extension

Answer: D

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48. In genetic engineering, which of the following is used ?

A. Plasmid

B. Plastid

C. Mitochondria

D. ER

Answer: A

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49. After 4 PCR cycles how many DNA molecules are formed from one DNA template molecule ?

A. 4

B. 32

C. 16

D. 8

Answer: C

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50. Select the correct order of processing of PCR

A. Extension, primer annealing, denaturation

B. Denaturation, primer annealing, extension

C. Denaturation, extension, primer annealing

D. Primer annealing, denaturation, extension

Answer: B

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51. Plasmid vector in DNA recombinant technology means

A. a virus that transfers gene to bacteria

B. extra-chromosomal autonomously replicating circular DNA

C. sticky end of DNA

D. any fragment of DNA carrying desirable gene

Answer: B

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52. Which of the following statement is not correct about cloning vector ?

A. Ori' is a sequence responsible for controlling the copy number of the linked DNA

B. Selectable marker selectively permitting the growth of the non-transformants

C. In order to link the alien DNA, the vector needs to have single recognition site for the commonly used restriction enzymes

D. The ligation of alien DNA is carried out at a restriction site present in one of the two antibiotic resistance genes

Answer: C

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53. Assetion: In recombinant DNA technology, human genes are often transferred into bacteria (prokaryotes) or yeast (eukaryote)

Reason : Both bacteria and yeast multiply very fast to form huge population, which express the desired gene

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If the assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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54. Assetion: Restriction enzymes cut the strand 27 of DNA to produce sticky ends

Reason : Stickiness of the ends faciliates the action of the enzyme DNA polymerase

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If the assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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55. Assetion: Insertion of recombinant DNA within the coding sequence of $\beta-$ galactosidase result n colourless colonies.

Reason : Presence of insert results in

inactivation of enzyme $\beta -$ galactosidase known as insertional inactivation

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

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If the assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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