CHAPTER WISE TEST

YOUR COLLEGE NAME HERE

CHAPTER TEST (NEET UG-2025)

Biotechnology - Principles and Processes

Subject: Biology **NEET - B - CT - 28**

Time Allowed: 60 min **Maximum Marks – 360**

Instructions for the candidate:

The paper consists of 100**(Hundred)** Questions, which are divided in to Four sections

(a) Section A shall consist of 35**(Thirty-five)** Questions. in which all questions are compulsory

(b) Section B shall consist of 15 **(fifteen)** Questions. in which any 10**(Ten)** of them should be answered.

BIOLOGY-I Section - A (Q. No. 1 to 35)

1. Which of the following processes/techniques can be included under biotechnology?

   (i) in vitro fertilisation leading to test tube baby

   (ii) Synthesis of a gene

   (iii) Correcting a defective gene

   (iv) Developing a DNA vaccine

   1. (i) and (ii) only
   2. (ii) and (iii) only
   3. (iii) and (iv) only
   4. (i), (ii), Gil) and (iv)

2. 'The integration of natural science and organisms, cells, parts thereof, and molecular analogues for products and services', is the definition for

   1. biomarketing given by Harvard Business school
   2. bioprocesses given by Swiss Institute of bioinformatics
   3. biotechnology given by European Federation of Biotechnology (EFB)
   4. biomolecules given by Association of biomolecular resource facilities.

3. The core techniques of modern biotechnology is/are

   1. genetic engineering
   2. bioprocess engineering
   3. both 1 and 2
   4. none of these

4. The term 'recombinant DNA' refers to

   1. DNA of the host cell
   2. DNA with a piece of foreign DNA
   3. DNA with selectable marker
   4. DNA with more than one recognition sites.

5. Plasmid used to construct the first recombinant DNA was isolated from which bacterium species?

1. Escherichia coli
2. Salmonella typhimurium
3. Agrobacterium tumefaciens
4. Thermus aquaticus

6. The term 'molecular scissors' refer to
1. recombinant DNA
2. restriction enzymes
3. Taq polymerase
4. palindromic nucleotide sequences.

7. The term 'chemical knife' refers to
1. polymerases 2. Endonucleases
3. ligase 4. cellulases

8. Genetic engineering is possible because
1. we can cut DNA at specific sites by restriction endonucleases
2. restriction endonucleases purified from virus can be used in bacteria
3. the phenomenon of transduction in bacteria is well understood
4. We can see DNA by electron microscope.

9. In recombinant DNA technology, the term vector refers to
1. the enzyme that cuts DNA into restriction fragments
2. the sticky end of a DNA fragment
3. a plasmid used to transfer DNA into a living cell
4. a DNA fragment which carries only ori gene.

10. Which of the following is not a tool of genetic engineering?
1. Cloning vector
2. Restriction enzyme
3. Foreign DNA
4. Vaccine

11. The first restriction endonuclease isolated was
1. Ecok I 2. BamH I
3. Sal I 4. Hind II

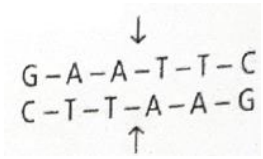
12. The source of the restriction enzyme EcoRI is
1. Escherichia coli RY 13
2. Haemophilus influenzae Rd
3. Bacillus amyloliquefaciens H
4. Streptomyces albus.

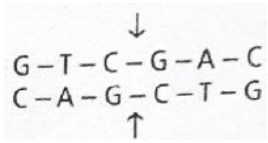
13. The letter 'R' in EcoRI is derived from
1. the name of genus
2. the name of strain
3. the name of species
4. the term 'restriction'.

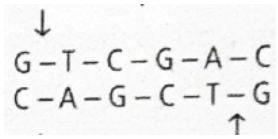
14. Restriction endonucleases cut
1. single stranded DNA at as particular point by identifying a nuclear localisation signal
2. double stranded RNA at a particular point by not identifying a specific recognition site
3. each of the two strands of the double helix, at specific points in their sugar -phosphate backbones by identifying a specific recognition site
4. single stranded DNA at a particular point by not identifying a specific recognition site.

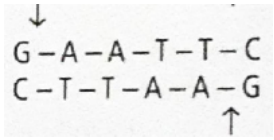
15. Read the given statement and select the correct option.
Statement 1: Restriction endonuclease enzymes recognise a specific palindromic nucleotide sequency in the DNA.
Statement 2: Restriction endonuclease enzymes are called as molecular scissors or biological scissors.
1. Both statements 1 and 2 are correct.
2. Statement 1 is correct but statement 2 is incorrect
3. Statement 1 is incorrect but statement 2 is correct
4. Both statements 1 and 2 are incorrect

16. Which of the following correctly depicts the recognition site for EcoRI?

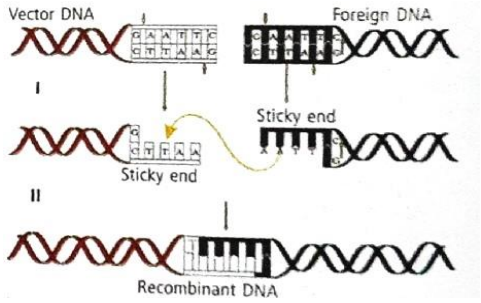
1. 

2. 

3. 

4. 

17. Study the following figures and identify the enzymes involved in steps I and II



1. EcoRl and DNA ligase
2. Hindll and DNA ligase
3. EcoRl and Hindll
4. Restriction endonuclease and exonuclease

18. Identity the DNA segment which is not a palindromic sequence.

1. $5'GGATCC3'$
 $3'GGTACC5'$
2. $5'GAATTC3'$
 $3'CTTAAG5'$
3. $5'GCGGCCGC3'$
 $3'CGCCGGCG5'$
4. $5'CCCGGG3'$
 $3'GGGCCC5'$

19. Which of the following statements is not correct regarding EcoRI restriction endonuclease enzyme?

1. It is isolated from Escherichia coli RY 13.
2. its recognition sequence is
 $5'-GAATTC-3'$
 $3'-CTTAAG-5'$
3. It produces complementary blunt ends.
4. None of these

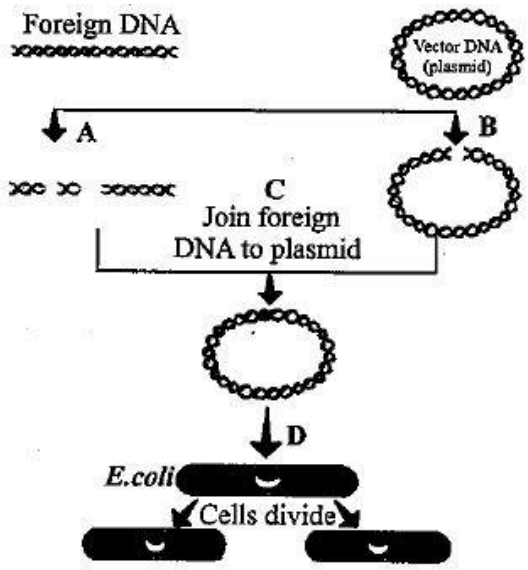
20. Sticky ends of vector and foreign DNA are joined by

1. DNA polymerase I
2. RNA polymerase
3. DNA ligase
4. DNA polymerase III

21. How many fragments will be generated if you digest a linear DNA molecule with a restriction enzyme having four recognition sites on the DNA?

1. 3
2. 6
3. 5
4. 4

22. Identify A, B, C and D in the flow chart given below that represents the process of recombinant DNA technology.



1. A-Restriction endonuclease, B-Restriction exonuclease, C-DNA ligase, D-Transformation

2. A-Restriction endonuclease, B-Restriction endonuclease, C-DNA ligase, D-Transformation

3. A-Restriction endonuclease, B-Restriction endonuclease, C-Hydrolase, D-Transformation

4. A-Restriction endonuclease, 8-Restriction endonuclease, C-Hydrolase, D-Transduction

23. Gel electrophoresis 1s a

1. technique of separation of charged molecules under the influence of magnetic field

2. technique of incorporation of DNA molecules into the cell through transient pores made due to electrical impulses

3. technique of separation of DNA fragments through the pores of agarose gel under the influence of electric field

4. technique of separation and purification of gene products.

24. Which of the following steps should be performed by a person in order to visualise the bands of DNA fragments obtained from gel electrophoresis?

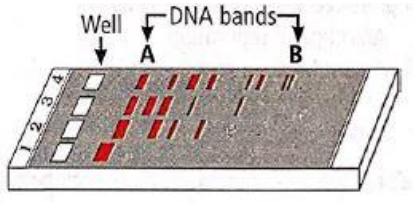
1. Direct exposure of DNA fragments to UV radiations,

2. Staining with bromophenol blue followed by exposure to UV radiations.

3. Staining with ethidium bromide followed by exposure to UV radiations.

4. Person can see the bands without staining.

25. Study the given figure carefully and select the incorrect statements regarding this.



(i) It represents a typical agarose gel electrophoresis in which lane 1 contains undigested DNA.

(ii) Smallest DNA bands are formed at A and largest DNA bands are formed at B.

(iii) The separated DNA fragments can be visualised after staining in the visible light.

(iv) The separated DNA bands are cut out from the agarose gel and extracted from the gel piece. This step is known as elution.

1. (i) and (ii) 2. (ii) and (iii)
3. (ii) and (iv) 4. (i) and (iv)

26. Gel electrophoresis is used for

1. construction of recombinant DNA by joining with cloning vectors

2. isolation of DNA molecules

3. cutting of DNA into fragments

4. separation of DNA fragments according to their size.

27. Read the following statements and select the correct ones.

(i) Same kind of sticky ends are produced when a DNA has been cut by different restriction enzymes.

(ii) Exonucleases make cuts at specific positions within the DNA.

(iii) Hind II was the first restriction endonuclease to be isolated

(iv) A bacteriophage has the ability to replicate within bacterial cells by integrating its DNA with bacterial DNA

(v) DNA fragments move towards the cathode under an electric field through a medium.

1. (i), (iii) and (v)

2. (i) and (iv)

3. (iii) and (iv)

4. (ii), (iii) and (iv)

28. Name the fluorescent intercalating dye used to stain DNA.
1. Basic lipofuscin
2. Safranin
3. Janus green- B
4. Ethidium bromide

29. During elution (i) coloured bands of DNA, are observed in a gel stained with (ii) dye, under (iii) and (iv) to be extracted with an elution kit..
1. (i) bright green, (ii) janus green, (iii) gamma radiation, (iv) cut out
2. (i) bright pink, (ii) acetocarmine, (iii) Ultra-voilet radiation, (iv) diluted
3. (i) bright orange, (ii) ethidium bromide, (iii) Ultra voilet radiation, (iv) cut out
4. (i) bright yellow, (ii) basic lipofuscin, (iii) gamma radiation, (iv) cut out

30. A mixture contain DNA fragments a, b, ¢ and d with molecular weights of a + b = c, a > b and d > c was subjected to agarose gel electrophoresis. The positions of these fragments from cathode to anode sides of the gel would be
1. b, a, c, d
2. a, b, c, d
3. c, b, a, d
4. b, a, d, c

31. Read the given statement and select the correct option.
Statement 1: Plasmids and bacteriophages have the ability to replicate within bacterial cells independent of the cotrol of chromosomal DNA.
Statement 2: If we are able to link an alien piece of DNA with bacteriophage or plasmid DNA, we can multiply its numbers equal to the copy number of the plasmid or bacteriophage.
1. Both statements 1 and 2 are correct.
2. Statement 1 is correct but statement 2 is incorrect
3. Statement 1 is incorrect but statement 2 is correct
4. Both statements 1 and 2 are incorrect

32. Select the correct one,
1. ori, rop are cloning sites.
2. Cloning is making unidentical copies of a template gene
3. Pvu I and Pst I are not restriction enzymes.
4. pBR322 is a cloning vector.

33. Which one of the following characteristics is generally not preferred for a cloning vector?
1. An origin of replication
2. An antibiotic resistance marker
3. Multiple restriction sites
4. A high copy number

34. What will be the effect if pBR322, a cloning vector does not carry 'ori' site?
1. Sticky ends will not produce.
2. Transformation will not takes place.
3. The cell will transform into a tumour cell.
4. Replication will not take place.

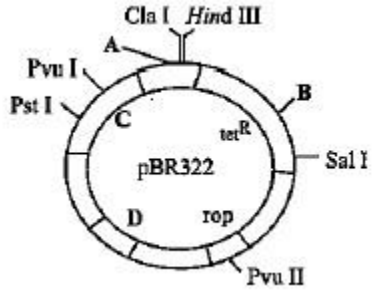
35. For selectable marker
I. It helps to select the host cells which contain the vector and eliminate the non-transformants.
II. Genes encoding resistance to antibiotics like ampicillin, chloramphenicol, tetracycline or kanamycin, are useful selectable markers for E.coli.
Which of the statements given above is/are correct?
1. Only I
2. Only II
3. Both I and II
4. None of these

BIOLOGY-I Section - B (Q. No. 36 to 50)

36. The gene 'rop' present in pBR322 cloning vector, codes for

1. the proteins involved in the translation
2. the proteins involved in the replication of the plasmid
3. the proteins involved in the synthesis of ampicillin only
4. the proteins involved in the synthesis of tetracycline only

37. Identify A, B, C and D in the given figure of E. coli cloning vector pBR322 and select the correct option.



	A	B	C	D
1	HindI	EcoRI	amp^R	Ori
2	HindI	BamHI	Kan^R	amp^R
3	BamHI	PstI	ori	amp^R
4	EcoRI	BamHI	amp^R	ori

38. Read the given statement and select the correct option.

Statement 1: The cloning vector is required to have very few, preferably single, recognition sites for the commonly used restriction enzymes.

Statement 2: Presence of more than one recognition sites within a cloning vector will generate several fragments, which will complicate the process of gene cloning.

1. Both statements 1 and 2 are correct.
2. Statement 1 is correct but statement 2 is incorrect
3. Statement 1 is incorrect but statement 2 is correct
4. Both statements 1 and 2 are incorrect

39. In pBR322, tetracycline resistance gene (tet^R) has recognition site for which of the following restriction endonuclease?

1. Hind III
2. BamH I
3. EcoR I
4. Pst I

40. Which of the following is not a characteristic of pBR322 vector?

1. It consists of rop that codes for proteins involved in plasmid replication.
2. It is the most widely used, versatile and easily manipulated vector.
3. It has two antibiotic resistance genes tetR and amp^R.
4. It does not have restriction site for Sal I.

41. If a recombinant DNA bearing gene for resistance to antibiotic ampicillin is transferred to E.coli cells, the host cells become transformed into ampicillin resistant cells. If such bacteria are transferred on agar plates containing ampicillin, only transformants will grow and the non-transformed recipient cells will die. The ampicillin resistant gene in this Case is called as

1. selectable marker
2. recombinant protein
3. cloning site
4. chemical scalpels

42. Select the correct option.

Statement 1: In insertional! inactivation, blue colour produced by bacterial colonies indicates that the plasmid does not have an insert into the bacterial genome.

Statement 2: Presence of insert results into insertional inactivation of β-galactosidase enzyme and the colonies do not produce any colour.

1. Both statements 1 and 2 are correct.
2. Statement 1 is correct but statement 2 is incorrect
3. Statement 1 is incorrect but statement 2 is correct
4. Both statements 1 and 2 are incorrect

43. if a person obtains transformants by inserting a recombinant DNA within the coding sequence of enzyme β-galactosidase, he will separate out recombinants from non-recombinants by which of the following observations?

1. Non-recombinant colonies do not produce any colour whereas recombinants give blue coloured colonies
2. Recombinant colonies do not produce any colour whereas non-recombinants give blue coloured colonies
3. Recombinants and non-recombinants both produce blue coloured colonies.
4. No colonies are formed due to insertional inactivation,

44. During insertional inactivation, the presence of a chromogenic substrate gives blue coloured colonies if the plasmid in the bacteria does not have an insert. The blue colour is produced by the enzyme

1. $\alpha-$glucosidase
2. restriction endonuclease
3. $\alpha-$galactosidase
4. Taq polymerase.

45. Which of the following bacteria is used as a vector for plant genetic engineering?

1. Agrobacterium tumefaciens
2. Bacteriophages
3. Thermus aquaticus
4. Pyrococcus furiosus

46. Read the given statement and select the correct option.

Statement 1: The tumour inducing plasmid (Ti plasmid acts as a cloning vector in recombinant DNA technology.

Statement 2: The Ti plasmid which is used in the mechanisms of delivering genes to a cell remains pathogenic.

1. Both statements 1 and 2 are correct.
2. Statement 1 is correct but statement 2 is incorrect
3. Statement 1 is incorrect but statement 2 is correct
4. Both statements 1 and 2 are incorrect

47. Which of the following microbes transform normal plant and animal cells to cancerous cells respectively?

1. Retroviruses and Rhizobium
2. Escherichia coli and Agrobacterium tumefaciens
3. Agrobacterium tumefaciens and retroviruses
4. Agrobacterium tumefaciens and A.rhizogenes

48. Read the given statements A-E and answer the questions following them.

A. BamHl site is located in tet^R in pBR322

B. Ti plasmid is obtained from E.coli

C. Replication of bacteriophages in bacteria is independent control of chromosomal DNA

D. First artificial recombinant DNA was constructed by Cohen and Boyer in 1972

E. In animals, retroviruses can transform the normal cells into cancerous cells

1. All
2. One
3. Three
4. Four

49. Read the given statement and select the correct option.

Statement 1: DNA is a hydrophobic molecule, it cannot pass through cell membranes.

Statement 2: In order to force bacteria to take up the plasmid, the bacterial cells must first be made 'competent' to take up DNA.

1. Both statements 1 and 2 are correct.
2. Statement 1 is correct but statement 2 is incorrect
3. Statement 1 is incorrect but statement 2 is correct
4. Both statements 1 and 2 are incorrect

50. Which of the following is used for transformation of rDNA into bacterial cells?

1. Na^+ 2. Ca^{2+}
3. K^+ 4. NO_3^{2-}

BIOLOGY-II Section - A (Q. No. 51 to 85)

51. The correct sequence of making a cell competent is

1. treatment with divalent cations $\rightarrow$incubation of ells with recombinant DNA on ice $\rightarrow$heat shock $(42°C) \rightarrow$ placing on ice
2. heat shock $(42°C) \rightarrow$incubation of cells with recombinant DNA on ice $\rightarrow$treatment with divalent cations $\rightarrow$placing on ice
3. treatment with divalent cations $\rightarrow$placing on Ice $\rightarrow$incubation of cells with recombinant DNA on ice $\rightarrow (42°C)$
4. incubation of cells with recombinant DNA on ice $\rightarrow$heat shock $(42°C) \rightarrow$treatment with divalent cations $\rightarrow$placing on ice.

52. Which of the following is required for gene gun method of gene transfer?

1. Microparticles 2. Micropipettes
3. Divalent cations 4. UV radiations

53. In biolistic method of gene transfer, the micro-particles coated with foreign DNA are bombarded into target cells é a very high velocity. These micro-particles are made up of

1. silver or tungsten
2. arsenic or silver
3. gold or tungsten
4. none of these.

54. The different steps of recombinant DNA technology are given below randomly.

(i) Isolation of the DNA fragments or genes to be cloned.

(ii) Introduction of the recombinant DNA into a suitable cell (usually E. coli) called host (transformation).

(iii) Multiplication/expression of the introduced gene in the host.

(iv) Selection of the transformed host cells and identification of the clone containing the desired gene/DNA fragment.

(v) Insertion of the isolated gene in a suitable plasmid vector,

Which of the following represents the correct sequence of steps?

1. $(i) \rightarrow (iii) \rightarrow (ii) \rightarrow (iv) \rightarrow (v)$
2. $(iii) \rightarrow (ii) \rightarrow (i) \rightarrow (v) \rightarrow (iv)$
3. $(i) \rightarrow (v) \rightarrow (ii) \rightarrow (iv) \rightarrow (iii)$
4. $(v) \rightarrow (i) \rightarrow (iii) \rightarrow (iv) \rightarrow (ii)$

55. Fill up the blanks and select the correct option.

(i) EcoRI cuts the DNA between bases _____ only when the sequence_____is present in the DNA duplex.

(ii) Disruption of the cell membranes can be achieved by treating the bacterial cells, plant cells and fungal cells with enzymes_____, _____ and _____ respectively.

(iii) Since DNA has a_____charge, it moves towards the _____ of the electrophoretic chamber.

1. (i) Gand A, GAATTC (ii) endonuclease, chitinase, cellulase (iii) negative, anode
2. (i) G and A, GAATTC (ii) lysozyme, cellulase, chitinase (iii) positive, cathode
3. (i) G and A, GAATTC (ii) lysozyme, cellulase, chitinase (iii) negative, anode
4. (i) G and A, GAAATC (ii) lysozyme, cellulase, chitinase (iii) positive, cathode

56. in the isolation of DNA, removal of protein and RNA is carried out by enzymes _____ and _____ respectively.
1. lysozyme, ribonuclease
2. protease, cellulase
3. protease, ribonuclease
4. ribonuclease, chitinase

57. During isolation of genetic material, the chemical used to precipitate out the purified DNA is
1. bromophenol blue
2. chilled ethanol
3. ethidium bromide
4. both (1) and (3).

58. Process used for amplification or multiplication of DNA in DNA fingerprinting is
1. polymerase chain reaction
2. southern blotting
3. agarose gel electrophoresis
4. insertional inactivation.

59. The correct sequence of different steps of polymerase chain reaction is
1. annealing $\rightarrow$ denaturation $\rightarrow$ extension
2. denaturation $\rightarrow$ extension $\rightarrow$ annealing
3. denaturation $\rightarrow$ annealing $\rightarrow$ extension
4. extension $\rightarrow$ denaturation $\rightarrow$ annealing

60. Primers are
1. chemically synthesised oligonucleotides that are complementary to the regions of DNA
2. chemically synthesised oligonucleotides that are not complementary to the regions of DNA
3. chemically synthesised, autonomously replicating circular DNA molecules
4. specific sequences present on recombinant DNA.

61. Enzyme' Taq polymerase' used in PCR, has been isolated from bacterium
1. Agrobacterium tumefaciens
2. Thermus aquaticus
3. Streptomyces albus
4. Escherichia coli.

62. Which one is a true statement regarding Taq DNA polymerase used in PCR?
1. It is used to ligate introduced DNA in recipient cells.
2. It serves as a selectable marker.
3. It is isolated from a virus.
4. It remains active at high temperature.

63. Read the given statements and select the incorrect option.
1. Genetic engineering is a technique to alter the structure and function of DNA and RNA.
2. A plasmid can be used as a vector to transfer desired gene in a host cell.
3. Cutting of DNA at specific locations became possible with the discovery of restriction enzymes
4. If any protein encoding gene is expressed in a homologous host, it is called a recombinant protein.

64. A device in which large volume of living cells are cultured in order to get a specific product is called
1. PCR
2. Agitator
3. bioreactor
4. assimilator

65. Which of the following statements are correct with respect to a bioreactor?
(i) It can process large volumes of culture,
(ii) It provides optimum temperature and pH.
(iii) It has an oxygen delivery system.
1. (i) and (ii)
2. (i), (i) and (iii)
3. (i) and (iii)
4. (ii) and (ii)

66. Stired-tank bioreactor have been designed for

1. purification of product
2. addition of preservatives to the product
3. availability of oxygen throughout the process
4. ensuring anaerobic conditions in the culture vessel.

67. After completion of the biosynthetic stage in the bioreactors, the product undergoes separation and purification processes, collectively termed as

1. transformation
2. electrophoresis
3. downstream processing
4. upstream processing.

68. Which of the following is a component of downstream processing?

1. Separation 2. Purification
3. Clinical trials 4. Both (1) and (2)

69. Match column | with column II with respect to the nomenclature of restriction enzyme EcoRI and select the correct answer from the given codes,

	Column I		Column II
A	E	i	1st in order of isolation
B	Co	ii	Name of genus
C	R	iii	Name of species
D	I	iv	Name of strain

1. A-(iii), B-(i), C-(ii), D-(iv)
2. A-(ii), B-(i), C-(iii), D-(iv)
3. A-(i), B-(ii), C-(ii), D-(iy)
4. A-(ii), B-(iii), C-(iv), D-(i)

70. Match column | with column II with respect to the nomenclature of restriction enzyme EcoRI and select the correct answer from the given codes,

	Column I		Column II
A	Transformation	i	Sequences cut by restriction enzymes
B	Recognition site	ii	Process by-which DNA fragments are separated based on their size
C	Gel electrophoresis	iii	Plasmid DNA that has incorporated human DNA
D	Recombinant DNA	iv	Process by which bacteria take up pieces of DNA from the environment

1. A. (iii), B -(i), C (ii), D- (iv)
2. A-(iv), B-(i), C-(ii), D-(iii)
3. A-(i), B- (ii), C-(iii), D-(iv)
4. -(ii), B-(iii), C-(iv), D-(i)

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

1. Plant cells – Cellulase
2. Bacteria - Methylase
3. Fungi - Chitinase
4. None of these

72. Select correct answer from the given codes,

	Column I		Column II
A	Taq DNA polymerase	i	Cleaves the ends of linear DNA
B	Exonuclease	ii	Breakdown of fungal cell wall
C	Protease	iii	Stable above $90°C$
D	Chitinase	iv	Made only by eukaryotic cells
		v	Degradation of proteins

1. A-(iii) B-(iv), C-(i), D -(ii)
2. A-(iv), B-(iii), C-(i), D-(ii)
3. A-(ii), B-(i), C-(v), D-(iii)
4. A-(iii), B-(i), C-(v), D-(ii)

73. Which one of the following is not a correct match?
1. Tumour inducing - Ti plasmid
2. Ribonuclease - Removes RNA
3. PCR - DNA staining
4. Agarose - Sea weeds

74. Assertion: Genetic engineering can overcome the drawbacks of traditional hybridisation.
Reason: Genetic engineering can create desired DNA sequences to meet specific requirements.
1. If both assertion and reason are true and reason is the correct explanation of assertion.
2. If both assertion and reason are true but reason is not the correct explanation of assertion.
3. If assertion is true but reason is false.
4. If assertion is false but reason is true.

75. Assertion: A piece of DNA insert into an alien organism generally does not replicate if not inserted into a chromosome.
Reason: Chromosomes have specific sequences called 'ori' region where DNA replication is initiated.
1. If both assertion and reason are true and reason is the correct explanation of assertion.
2. If both assertion and reason are true but reason is not the correct explanation of assertion.
3. If assertion is true but reason is false.
4. If assertion is false but reason is true.

76. Assertion: A bacterial cell with no restriction enzymes will be easily infected and lysed by bacteriophages,
Reason : Restriction enzymes catalyse synthesis of protective coat around bacterial cell that prevents bacteriophage attack.
1. If both assertion and reason are true and reason is the correct explanation of assertion.
2. If both assertion and reason are true but reason is not the correct explanation of assertion.
3. If assertion is true but reason is false.
4. If assertion is false but reason is true.

77. Assertion : DNA fragments move towards the anode under an electric field.
Reason : Smaller the DNA fragment size the farther it moves,
1. If both assertion and reason are true and reason is the correct explanation of assertion.
2. If both assertion and reason are true but reason is not the correct explanation of assertion.
3. If assertion is true but reason is false.
4. If assertion is false but reason is true.

78. A gene whose expression helps to identify trans- formed cell is known as:
1. Vector
2. Plasmid
3. Structural gene
4. Selectable marker

79. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.
1. The enzyme binds DNA at specific sites and cuts only one of the two strands.
2. The enzyme cuts the sugar-phosphate backbone at specific sites on each strand,
3. The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.
4. The enzyme cuts DNA molecule at identified position within the DNA.

80. Choose the correct pair from the following:

1. Ligases - Join the two DNA molecule

2. Polymerases - Break the DNA into fragments

3. Nucleases - Separate the two strands of DNA

4. Exonucleases - Make cuts at specific positions within DNA

81. During the process of gene amplification using PCR, if very high temperature is not maintained in the beginning, then which of the following steps of PCR will be affected first?

1. Ligation 2. Annealing

3. Extension 4. Denaturation

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

1. Laboratory flask of largest capacity

2. A stirred-tank bioreactor without inlets and outlets

3. A continuous culture system

4. Any of the above

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

1. Herbert Boyer

2. Hargovind Khurana

3. Kary Mullis

4. Arthur Kornberg

84. Which process is represented in following diagram?

1. PCR 2. DNA fingerprinting

3. CTAB 4. DNA spooling

85. What is the source of Ti plasmid which is modified and used as a cloning vector to deliver the desired genes into plant cells?

1. Agrobacterium tumefaciens

2. Thermophilus aquaticus

3. Pyrococcus furiosus

4. Aedes aegypti

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86. 30 cycles of PCR amplified DNA approximately is how many times?

1. 1 billion times 2. 1 million times

3. 100 times 4. 1000 times

87. What is the maximum volume of culture that can be processed in bioreactors?

1. 10 – 100 litres

2. 100 – 1000 litres

3. 1 – 10 litres

4. 1000 – 1,00,000 litres

88. Bioreactors have

1. Foam control system, temperature control system

2. Oxygen delivery system

3. pH control system

4. All the above

89. The best cloning organism for genetic engineering and biotechnology is

1. Agrobacterium 2. Pseudomonas

3. E. coli 4. Lambda phage

90. Assertion: E. coli having pBR322 with DNA insert at BamHI site cannot grow in medium containing tetracycline

Reason: Recognition site for BamHI is present in tet region of pBR322.

1. If both assertion and reason are true and reason is the correct explanation of assertion.
2. If both assertion and reason are true but reason is not the correct explanation of assertion.
3. If assertion is true but reason is false.
4. If assertion is false but reason is true.

91. Assertion: Use of chitinase enzyme is necessary for isolation of DNA from yeast cells but not in case of Spirogyra.
Reason: Fungal cell wall is made of or chitin.
1. If both assertion and reason are true and reason is the correct explanation of assertion.
2. If both assertion and reason are true but reason is not the correct explanation of assertion.
3. If assertion is true but reason is false.
4. If assertion is false but reason is true.

92. Engineered bacteria are reproduced by inserting
1. Plasmids DNA
2. Desired DNA (gene/s) loaded on vector DNA
3. Vehicle DNA
4. Phage DNA

93. Which is not a vector for rDNA technology?
1. Plasmids 2. Cosmids
3. Phages 4. Mosquitoes

94. Two microbes found to be very useful in genetic engineering are
1. Vibrio cholerae and a tailed bacteriophage
2. Diplococcus sp. and Pseudomonas sp.
3. Crown gall bacterium and Caenorhabditis elegans
4. Escherichia coli and Agrobacterium tumefaciens

95. The Ti plasmid is often used for making transgenic plants. This plasmid is found in
1. Azotobacter
2. Rhizobium of the roots of leguminous plants
3. Agrobacterium
4. Yeast as a $2\mu m$ plasmid

96. Which of the following will be done with product formed by rDNA technology?
1. Product has to be formulated with suitable preservation
2. Formulation has to undergo clinical trials.
3. Strict quality control testing is done.
4. All the above

97. Bacteriophages are used in biotechnology as
1. Vector or vehicle DNA
2. Cloning organism
3. Restriction enzyme synthesizers
4. None of these

98. The transgenic animals are those which have
1. foreign DNA in some of its cells
2. foreign DNA in all its cells
3. foreign RNA in all its cells
4. DNA and RNA both in the cells

99. Which of the following properties make plasmids suitable vectors for gene cloning?
1. Plasmids often carry antibiotic resistance gene
2. Plasmids can shuttle between prokaryotic and eukaryotic cells
3. plasmids are small circular DNA molecules with their own replication origin site
4. Plasmids are small circular DNA molecules that can integrate with chromosomal DNA

100. Introduction of one or more genes into an organism which normally does not possess them or their deletion by using artificial means (not by breeding) comes under
1. molecular biology
2. cytogenetics
3. genetic hybridization
4. genetic engineering