ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

path to success

PRE-MEDICAL

ZOOLOGY

ENTHUSIAST | LEADER | ACHIEVER

EXERCISE

Biotechnology : Principles & Processes and Applications

ENGLISH MEDIUM

EXERCISE-I (Conceptual Questions) — Build Up Your Understanding

PRINCIPLES AND PROCESSES

1. *Agrobacterium tumefaciens* used in Genetic engineering for :-
(1) DNA-mapping
(2) DNA-modification
(3) Gene transfer
(4) DNA finger printing

BT0001

2. Who isolated the first restriction endonucleases :-
(1) Temin & Baltimore (2) Sanger
(3) Smith (4) Paul berg

BT0003

3. Genetic engineering is :-
(1) Study of extra nuclear gene
(2) Manipulation of genotype by artificial method
(3) Manipulation of RNA
(4) Manipulation of enzymes

BT0004

4. Polymerase chain reaction technology (PCR-technique) is used for :-
(1) DNA identification
(2) DNA repair
(3) DNA amplification
(4) Cleave DNA

BT0005

5. Which structure involved in genetic engineering:-
(1) Plastid (2) Plasmid
(3) Codon (4) None

BT0006

6. Which of the following is the example of chemical scissors –
(1) ECo - RI (2) Hind - III
(3) Bam - I (4) All the above

BT0007

7. Restriction endonucleases are used in genetic engineering bacause :-
(1) They can degrade harmful proteins
(2) They can join DNA fragments
(3) They can cut DNA at variable site
(4) They can cut DNA at specific base sequences

BT0008

8. When the genotype of an organism is improved by the addition of foreign gene, the process is called
(1) Tissue culture
(2) Genetic diversity
(3) Genetic engineering
(4) Plastic surgery

BT0009

9. A genetically manipulated organism containing in its genome one or more inserted gene of another species is called :-
(1) Transposon
(2) Gene expression
(3) Transgenic organism
(4) Retroposons

BT0010

10. Which vector is commonly used in the transfer of gene in a crop plant -
(1) Plasmids of *B. Subtilis*
(2) Bacteriophages
(3) Ti-plasmids of *Agrobacterium*
(4) *E. Coli* Phages

BT0011

11. The tumour indusing capacity of *Agrobacterium tumaefaciens* is located in extrachromosomal plasmid and called–
(1) Ti – plasmid
(2) Ri - plamid
(3) Lambda phage
(4) Plasmid $P^{BR\ 322}$

BT0012

12. Genetic engineering aims at :-
(1) Destroying wild gene
(2) Preserving defective gene
(3) Curing human disease by introducing new gene
(4) All the above

BT0013

13. A piece of nucleic acid using to find out a gene, by forming hybrid with it, is called as:-
(1) c – DNA (2) DNA probe
(3) Sticky end (4) Blunt end

BT0014

14. Taq - polymerase which is used for amplification of DNA related with :-
(1) Hybridoma technique
(2) PCR-technique
(3) Gene cloning
(4) r-DNA technology

BT0015

15. What is true for plasmid :–
(1) Plasmids are widely used in gene transfer
(2) These are found in virus
(3) Plasmid contains gene for vital activities
(4) These are main part of chromosome

BT0016

16. Which of the following cuts the DNA from specific places :–
(1) Restriction endonuclease
(2) Ligase
(3) Exonuclease
(4) Alkaline phosphate

BT0017

17. Manipulation of DNA in genetic engineering became possible due to the discovery of :–
(1) Restriction endonuclease
(2) DNA ligase
(3) Transcriptase
(4) Primase

BT0018

18. Which one of the following has found extensive use in genetic engineering work in plants
(1) *Bacillus coagulens*
(2) *Agrobacterium tumefaciens.*
(3) *Clostridium septicum*
(4) *Xanthomonas citri*

BT0019

19. Restriction endonucleases :
(1) Are enzymes which cleave DNA at specific sites
(2) Make DNA complementary to an existing DNA or RNA
(3) Cut or join DNA fragments
(4) Are required in vectorless direct gene transfer.

BT0020

20. Restriction endonucleases :-
(1) Are synthesized by bacteria as part of their defense mechanism
(2) Are present in mammalian cells for degradation of DNA when the cell dies
(3) Are used in genetic engineering for ligating two DNA molecules
(4) Are used for *invitro* DNA synthesis

BT0021

21. The Ti plasmid, is often used for making transgenic plants. This plasmid is found in :-
(1) Yeast
(2) *Azotobacter*
(3) *Rhizobium*
(4) *Agrobacterium*

BT0022

22. Which of the following is the example of direct gene transfer :-
(1) Microinjection
(2) Electroporation
(3) Particle gun
(4) All the above

BT0023

23. How many copies of DNA sample are produced in PCR technique after 6–cycle:-
(1) 4 (2) 32 (3) 64 (4) 16

BT0024

24. Thermal cycle takes place in which technique
(1) Gel electrophoresis
(2) PCR-technique
(3) Centrifugation
(4) Southern blotting

BT0025

25. BAC and YAC are :-
(1) Natural DNA obtained from bacteria and yeast
(2) Useful vectors for eukaryotic gene transfer
(3) Artificial DNA obtained from bacteria and yeast
(4) (2) & (3) both

BT0027

26. Restriction enzymes are :–
(1) Not always required in genetic engineering
(2) Essential tool in genetic engineering
(3) Nucleases that cleave DNA at specific sites
(4) (2) and (3) both

BT0028

27. Electroporation procedure involves :
(1) Fast passage of food through sieve pores in phloem elements with the help of electric stimulation.
(2) Opening of stomatal pores during night by artificial light
(3) Making transient pores in the cell membrane to introduce gene constructs
(4) Purification of saline water with the help of a membrane system.

BT0030

28. Which of the following restriction endonuclease enzyme produce blunt end in DNA :-

(1) Bam HI
```
      ↓
G G A T C C
C C T A G G
        ↑
```
(2) ECORI
```
    ↓
G A A T T C
C T T A A G
      ↑
```
(3) Hae–III
```
  ↓
G G C C
C C G G
  ↑
```
(4) All the above

BT0031

29. A bacterium modifies its DNA by adding methyl groups to the DNA, It does so to :-
(1) Clone its DNA
(2) Be able to transcribe many genes simultaneously
(3) Turn its gene on
(4) Protect its DNA from its own restriction enzyme

BT0032

30. The restriction enzyem ECORI has the property of
(1) endonuclease activity
(2) exonuclease activity
(3) ligation activity
(4) correcting the topology of replicating DNA

BT0033

31. DNA ligase is an enzyme that catalyses the:-
(1) splitting of DNA threads into small bits
(2) joining of the fragments of DNA
(3) denaturation of DNA
(4) synthesis of DNA

BT0034

32. ***Agrobacterium tumefaciens*** contains a large plasmid, which induces tumour in the plants it is termed as -
(1) Ti plasmid
(2) Ri plasmid
(3) Recombinant plasmid
(4) Shine Delgrano sequence

BT0035

33. More advancement in genetic engineering is due to :-
(1) Restriction endonuclease
(2) Reverse transcriptase
(3) Protease
(4) Zymase

BT0036

34. Which of the follwing is used as a best genetic vector in plants :-
(1) Bacillus thuriengenesis
(2) Agrobacterium tumifaciens
(3) Pseudomonas putida
(4) All of these

BT0037

35. Which of the following enzyme is used to join DNA fragments :-
(1) Terminase
(2) Endonuclease
(3) Ligase
(4) DNA polymerase

BT0038

36. A kind of Biotechnology involving manipulation of DNA is
(1) DNA replication
(2) Genetic engineering
(3) Denaturation
(4) Renaturation

BT0039

37. What is *true* of plasmid ?
(1) Found in viruses
(2) Contains genes for vital activities
(3) Part of nuclear chromosome
(4) Widely used in gene transfer

BT0040

38. A suitable vector for gene cloning in higher organism is
(1) Baculovirus
(2) Retrovirus
(3) *Salmonella typhimurium*
(4) *Neurospora crassa*

BT0041

39. PCR proceeds in three distinct steps governed by temperature they are in order of :-
(1) Denaturation, Annealing, Synthesis
(2) Synthesis, Annealing, Denaturation
(3) Annealing, Synthesis, Denaturation
(4) Denaturation, Synthesis, Annealing

BT0042

40. What is the source of the Ti (Tumor inducing) plasmid which is modified and used as a cloning vector to deliver the desirable genes into plant cells ?
(1) *Agrobacterium tumifaciens*
(2) *Thermophilus aquaticus*
(3) *Pyrococcus furiosus*
(4) *Aedes aegypti*

BT0043

41. The thermostable enzymes, 'Taq' isolated from thermophilic bacteria is :-
(1) RNA polymerases
(2) DNA polymerases
(3) Restriction endonucleases
(4) DNA ligases

BT0044

42. The term "molecular scissors" generally refers to:-
(1) DNA polymerases
(2) RNA polymerases
(3) Restriction endonucleases
(4) DNA ligases

BT0045

43. In the PCR technology the DNA segment is replicated over a billion times. This repeated replications catalyzed by the enzyme :-
(1) RNA polymerase
(2) Taq polymerase
(3) DNA dependent RNA polymerase
(4) Primase

BT0046

44. The restriction enzyme(s) used in recombinant DNA technology making staggered cuts in DNA leaving sticky ends is/are :-
(1) Eco RI (2) HindIII
(3) BamHI (4) All of the above

BT0047

45. Restriction enzyme Eco RI cuts the DNA between bases G and A only when the sequence in DNA is:
(1) GATATC (2) GAATTC
(3) GATTCC (4) GAACTT

BT0049

46. 'Transgenic' plants are produced by :-
(1) Inducing gene mutation
(2) Arresting spindle fibre formation
(3) Deleting sex chromosomes
(4) Introducing foreign genes

BT0050

47. For a DNA to function as a cloning vector the most essential requirement is :-
(1) multiple restriction sites
(2) several selectable markers
(3) circular nature
(4) 'ori' sequence

BT0051

48. According to EFB, "The integration of natural science and organisms, cells, parts thereof and molecular analogues for products and services," is known as–
(1) Biochemistry (2) Bioinformatics
(3) Biotechnology (4) Biology

BT0052

49. The stickiness of DNA ends facilitates the action of which enzyme –
(1) DNA polymerase
(2) DNA Ligase
(3) Restriction endonuclease
(4) Alkaline phosphatase

BT0053

50. Which technique is used to check the progression of restriction enzyme digestion–
(1) PCR
(2) Gel electrophorosis
(3) Southern Blotting
(4) Staining

BT0054

51. In gel electrophorosis, at which end of the gel the sample is loaded?
(1) In the wells
(2) Towards positive electrode
(3) Towards negative electrode
(4) 1 & 3 both

BT0055

52. An antibiotic resistance gene of plasmid vector which get inactivated due to insertion of alien DNA, helps in the selection of–
(1) Transformants
(2) Recombinants
(3) Non-Transformants
(4) 2 & 3 both

BT0056

53. In which type of bioreactor air bubbles dramatically increases the oxygen transfer area?
(1) Simple stirred tank bioreactor
(2) Sparged stirred tank bioreactor
(3) Both 1 & 2
(4) None of these

BT0057

54. Genetic modification (GM) has been used to–
(1) Create tailor made plants
(2) Supply alternative resources to industries
(3) Enhanced nutritional value of food.
(4) All of the above

BT0058

55. The choice of Bt-gene for experiment depends upon–
(1) The host plant/crop
(2) Targeted pest/insect
(3) Bacillus strain
(4) 1 & 2 both

BT0059

56. In nematode resistance by RNA interference, some specific genes were introduced which form dsRNA. These were introduced in–
(1) Nematode (2) Host plant
(3) Agrobacterium (4) All of these

BT0060

57. Select the incorrect match–
(1) Transgenic mice - Polio vaccine
(2) Rosie cow - α lactalbumin gene
(3) ssDNA/RNA probe - Gene therapy
(4) PCR - Molecular diagnosis

BT0061

58. In EcoRI, R is stand for
(1) Strain (2) Species
(3) Genus (4) Order

BT0062

59. Restriction endonucleases are used in genetic engineering to form
(1) Recombinant molecule of protein
(2) Recombinant molecule of DNA
(3) Recombinant molecule of protein & DNA
(4) Recombinant cell

BT0063

60. Which instrument is used for the separation of DNA fragments –
(1) PCR
(2) Gel electrophoresis
(3) Bioreactor
(4) Restriction endonuclease

BT0064

61. Which of following feature is not necessary for cloning vector–
(1) Origin of replication
(2) High copy number
(3) Selectable marker
(4) Cloning sites

BT0065

62. Which of the following is not true for cloning vector
(1) more than two origin site of replication
(2) vector should have selectable marker gene
(3) single recognition site for the commonly used restriction enzyme
(4) pBR-322 have tetracycline resistance gene

BT0066

63. Transformation is a procedure through which –
(1) A piece of DNA is introduced in a host bacterium
(2) A piece of DNA is introduced in a vector
(3) A piece of DNA is introduced from protein
(4) All

BT0067

64. Second letter of the name of restriction endonuclease came from the
(1) Genus of organism
(2) Species of organism
(3) Family of organism
(4) Class of organism

BT0068

65. To isolate DNA from fungi we have to break the wall. This is done by
(1) Lysozyme (2) Cellulose
(3) Invertase (4) Chitinase

BT0069

66. Which of the following enzyme will get inactivated in insertional inactivation
(1) Transacetylase (2) Permease
(3) β-galactosidase (4) Taq-polymerase

BT0070

67. In presence of chromogenic substrate recombinant bacteria gives
(1) Red coloured colonies
(2) Colourless colonies
(3) Blue colonies
(4) Green colonies

BT0071

68. Which of the following enzyme is known as molecular scissors
(1) Ligase (2) DNA polymerase
(3) Restriction enzyme (4) Helicase

BT0072

69. Which of the following is not required in PCR –
(1) DNA primer (2) DNA template
(3) RNA primer (4) Taq polymerase

BT0073

70. The substrate for restriction enzyme is –
(1) Single stranded RNA
(2) Proteins
(3) Double stranded DNA
(4) Single stranded DNA

BT0074

71. In recombinant DNA technology, the term vectors 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 probe used to identify a particular gene

BT0075

72. pBR-322 which is frequently used as a vector for cloning gene is–
(1) an original bacterial plasmid
(2) a modified bacterial plasmid
(3) a viral genome
(4) a transposon

BT0076

APPLICATION OF BIOTECHNOLOGY

73. Genetically engineered bacteria have been used in commercial production of
(1) Thyroxin (2) Testosterone
(3) Human insulin (4) Melatonium

BT0077

74. Important objective of biotechnology in agriculture section is
(1) To produce pest resistant varieties of plants
(2) To increase the nitrogen contant
(3) To decrease the seed number
(4) To increase the plant weight

BT0078

75. The name of drug used in cancer treatment produced by biotechnology is
(1) Interferon
(2) [HGH] Human growth hormone
(3) TSH
(4) Insulin

BT0079

76. The prerequisites for biotechnological production of antibiotics is
(1) To search an antibiotic producing microorganism
(2) To isolate the antibiotic gene
(3) To join antibiotic gene with E.coli plasmid
(4) All of the above

BT0080

77. Modern biotechnology consist :
(1) Genetic enginearing
(2) tissue culture
(3) Microbiology
(4) All the above

BT0081

78. First artificially synthesized hormone is :
(1) Secretin (2) Insulin
(3) Glucagon (4) Renin

BT0082

79. The protein products of the following Bt toxin genes *cryIAc* and *cryIIAb* are responsible for controlling:-
(1) Bolloworm (2) Roundworm
(3) Moth (4) Fruit fly

BT0084

80. A transgenic rice (Golden rice) has been developed for increased content of :-
(1) Vitamin A (2) Viamin B_1
(3) Vitamin C (4) Vitamin D

BT0085

81. During the processing of the prohormone "proinsulin" into the mature "insulin"
(1) C-peptide is added to proinsulin
(2) C-peptide is removed from proinsulin
(3) B-peptide is added to proinsulin
(4) B-peptide is removed from proinsulin

BT0086

82. A genetically engineered bacteria used for clearing oil spills is :-
(1) *Escherischia coli*
(2) *Bacillus subtilis*
(3) *Agrobacterium tumifaciens*
(4) *Pseudomonas putida*

BT0087

83. First transgenic plant :-
(1) Potato (2) Tomato
(3) Tobacco (4) Maize

BT0088

84. E. coli are used in production of :-
(1) Rifampicin (2) LH
(3) Ecdyson (4) Interferon

BT0089

85. A giant rat is formed in the laboratory, what is the reason :–
(1) Gene mutation
(2) Gene synthesis
(3) Gene manipulation
(4) Gene replication

BT0090

86. Cultivation of Bt cotton has been much in the news. The prefix ''Bt'' means :–
(1) ''Barium – treated'' cotton seeds.
(2) ''Bigger thread'' variety of cotton with batter tensile strength.
(3) Produced by ''biotechnology'' using restriction enzymes and ligases.
(4) Carrying an endotoxin gene from Bacillus thuringiensis.

BT0091

87. Cry-gene which synthesize crystal protein isolated from :-
(1) *Bacillus thuriengensis*
(2) *Rhizobium*
(3) *Bacillus polymyxa*
(4) *Clostridium*

BT0093

88. Which of the following combination of risk are associated with genetically modified food :-
(1) Toxicity
(2) Allergic reaction
(3) Antibiotic resistance in microorganism present in alimentary canal
(4) All the above

BT0094

89. Gene therapy first used in the treatment of:–
(1) Albinism (2) Haemophilia
(3) SCID (4) LIQID

BT0095

90. Bt–cotton is resistant for :-
(1) Round–worm (2) Fluke–worm
(3) Boll–worm (4) Pin–worm

BT0098

91. Genetically engineered human insulin is called :-
(1) Humulin (2) Haematin
(3) Hybridoma (4) Hybrid
BT0099

92. The C-peptide is
(1) not present in proinsulin
(2) present in mature insulin
(3) removed during maturation of insulin
(4) also present in artificial insulin
BT0100

93. GEAC makes decisions regarding
(1) the validity of GM research
(2) the safety of introducing GM organisms for public services
(3) the validity of biopatents
(4) more than one options are correct
BT0101

94. The use of bio-resources by multinational companies & other organisations without proper authorisation from the countries & people concerned, is known as –
(1) Biopatent (2) Biopiracy
(3) Biowar (4) Biodiversity
BT0102

95. The Indian parliament has recently cleared which amendment of the Indian patents bill.
(1) 1^{st} (2) 2^{nd} (3) 3^{rd} (4) 4^{th}
BT0103

96. Which of the following peptide chain in not present in mature insulin.
(1) A-peptide (2) B-peptide
(3) C-peptide (4) A & B peptide
BT0104

EXERCISE-I (Conceptual Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	3	3	2	3	2	4	4	3	3	3	1	3	2	2	1
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	1	1	2	1	1	4	4	3	2	4	4	3	3	4	1
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	2	1	1	2	3	2	4	2	1	1	2	3	2	4	2
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	4	4	3	2	2	4	2	2	4	4	2	3	1	2	2
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	2	1	1	2	4	3	2	3	3	3	3	2	3	1	1
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	4	4	2	1	1	2	4	3	4	3	4	1	4	3	3
Que.	91	92	93	94	95	96									
Ans.	1	3	4	2	2	3									

EXERCISE-II (Previous Year Questions)

AIPMT/NEET

AIPMT 2006

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

BT0105

2. Restriction endonuclease –
(1) Cuts the DNA molecule randomly
(2) Cuts the DNA molecule at specific sites
(3) Restricts the synthesis of DNA inside the nucleus
(4) Synthesizes DNA

BT0106

3. Golden rice is a promising transgenic crop. When released for cultivation, it will help in
(1) Alleviation of vitamin A deficiency
(2) Pest resistance
(3) Herbicide tolerance
(4) Producing a petrol-like fuel from rice

BT0107

AIPMT 2007

4. A genetically engineered micro-organism used successfully in bioremediation of oil spills is a species of :-
(1) Pseudomonas (2) Trichoderma
(3) Xanthomonas (4) Bacillus

BT0108

AIPMT 2008

5. Cry1 endotoxins obtained from Bacillus thuringiensis are effective against :-
(1) Flies (2) Nematodes
(3) Boll worms (4) Mosquitoes

BT0109

6. Human insulin is being commercially produced from a transgenic species of :-
(1) Mycobacterium
(2) Rhizobium
(3) Saccharomyces
(4) Escherichia

BT0110

7. Main objective of production/use of herbicide resistant GM crops is to :-
(1) Eliminate weeds from the field without the use of herbicides
(2) Encourage eco-friendly herbicides
(3) Reduce herbicide accumulation in food articles for health safety
(4) Eliminate weeds from the field without the use of manual labour

BT0111

8. A transgenic food crop which may help in solving the problem of night blindness in developing countries is :-
(1) Starlink maize
(2) Bt Soybean
(3) Golden rice
(4) Flavr Savr tomatoes

BT0112

AIPMT 2009

9. Which one of the following is commonly used in transfer of foreign DNA into crop plants ?
(1) *Penicillium expansum*
(2) *Trichoderma harzianum*
(3) *Meloidogyme incognita*
(4) *Agrobacterium tumefaciens*

BT0113

10. Polyethylene glycol method is used for :-
(1) Energy production from sewage
(2) Gene transfer without a vector
(3) Biodiesel production
(4) Seedless fruit production

BT0114

11. Transgenic plants are the ones :-
(1) Grown in artificial medium after hybridization in the field
(2) Produced by a somatic embryo in artificial medium
(3) Generated by introducing foreign DNA in to a cell and regenerating a plant from that cell
(4) Produced after protoplast fusion in artificial medium

BT0115

12. The bacterium *Bacillus thuringiensis* is widely used in contemporary biology as :-
(1) Source of industrial enzyme
(2) Indicator of water pollution
(3) Insecticide
(4) Agent for production of dairy products

BT0116

13. What is *true* about Bt toxin ?
(1) The concerned *Bacillus* has antitoxins
(2) The inactive protoxin gets converted into active form in the insect gut
(3) Bt protein exists as active toxin in the *Bacillus*
(4) The activated toxin enters the ovaries of the pest to sterilise it and thus prevent its multiplication

BT0117

14. The genetic defect - adenosine deaminase (ADA) deficiency may be cured permanently by :-
(1) Enzyme replacement therapy
(2) Periodic infusion of genetically engineered lymphocytes having functional ADA cDNA
(3) Administering adenosine deaminase activators
(4) Introducing bone marrow cells producing ADA into cells at early embryonic stages

BT0118

AIPMT 2010

15. Which one of the following is used as vector for cloning genes into higher organisms?
(1) *Rhizopus nigricans*
(2) Retrovirus
(3) Baculovirus
(4) *Salmonella typhimurium*

BT0119

16. Restriction endonucleases are enzymes which :
(1) restrict the action of the enzyme DNA polymerase
(2) remove nucleotides from the ends of the DNA molecule
(3) make cuts at specific positions within the DNA molecule
(4) recognize a specific nucleotide sequence for binding of DNA ligase

BT0120

17. Which one of the following palindromic base sequences in DNA can be easily cut at about the middle by some particular restriction enzyme?
(1) 5'_____GAATTC _____3'
3'_____ CTTAAG _____5'
(2) 5'_____CACGTA _____3'
3'_____ CTCAGT_____5'
(3) 5'_____CGTTCG _____3'
3'_____ ATGGTA _____5'
(4) 5'_____GATATG _____3'
3'_____ CTACTA _____5'

BT0121

18. An improved variety of **transgenic basmati** rice :
(1) is completely resistant to all insect pests and diseases of paddy
(2) gives high yield but has no charactristic aroma
(3) does not require chemical fertilizers and growth hormones
(4) give high yield and is rich in vitamin A

BT0122

19. DNA or RNA segment tagged with a radiactive molecule is called :
(1) Clone (2) Plasmid
(3) Vector (4) Probe

BT0123

20. Genetic engineering has been successfuly used for producing :
(1) transgenic Cow-Roise which produces high fat milk for making ghee
(2) animals like bulls for farm work as they have super power
(3) transgenic mice for testing safety of polio vaccine before use in humans
(4) transgenic models for studying new treatments for certain cardiac diseases

BT0124

21. The genetically-modified (GM) brinjal in India has been developed for :
(1) Enhancing mineral content
(2) Drought-resistance
(3) Insect-resistance
(4) Enhancing shelf life

BT0125

22. Some of the characteristics of Bt cotton are:
(1) High yield and production of toxic protein crystals which kill dipteran pests
(2) High yield and resistance to bollworms
(3) Long fibre and resistance to aphids
(4) Medium yield, long fibre and resistance to beetle pests

BT0126

AIPMT Pre 2011

23. Given below is a sample of a portion of DNA strand giving the base sequence on the opposite strands. What is so special shown in it ?
5'_____GAATTC_____3'
3'_____CTTAAG_____5'
(1) Replication completed
(2) Delection mutation
(3) Start codon at the 5' end
(4) Palindromic sequence of base pairs

BT0127

24. There is a restriction endonuclease called EcoRI. What does "co" part in it stand for ?
(1) Colon
(2) Coelom
(3) Coenzyme
(4) Coli

BT0128

25. Agarose extracted from sea weeds finds use in:-
(1) Spectrophotometry
(2) Tissue Culture
(3) PCR
(4) Gel electrophoresis

BT0129

26. Maximum number of existing transgenic animals is of :-
(1) Fish (2) Mice
(3) Cow (4) Pig

BT0130

27. The process of RNA interference has been used in the development of plants resistant to :-
(1) Nematodes (2) Fungi
(3) Viruses (4) Insects

BT0131

AIPMT Mains 2011

28. Read the following four statements (A-D) about certain mistakes in two of them.
(A) The first transgenic buffalo, Rosie produced milk which was human alpha-lactalbumin enriched.
(B) Restriction enzymes are used in isolation of DNA from other macro molecules.
(C) Downstream processing is one of the steps of R-DNA technology.
(D) Disarmed pathogen vectors are also used in transfer of R-DNA into the host.
Which are the two statements having mistakes ?
(1) Statements (A) and (B)
(2) Statements (B) and (C)
(3) Statements (C) and (D)
(4) Statements (A) and (C)

BT0132

29. Silencing of mRNA has been used in producing transgenic plants resistant to:
(1) Bacterial blights
(2) Bollworms
(3) Nematodes
(4) White rusts

BT0133

30. *Bacillus thuringiensis* forms protein crystals which contain insecticidal protein.
This protein :
(1) does not kill the carrier bacterium which is itself resistant to this toxin
(2) binds with epithelial cells of midgut of the insect pest ultimately killing it
(3) is coded by several genes including the gene *cry*
(4) is activated by acid pH of the foregut of the insect pest

BT0134

31. Which one of the following techniques made it possible to genetically engineer living organisms?
(1) Hybridization
(2) Recombinant DNA techniques
(3) X-ray diffraction
(4) Heavier isotope labelling

BT0135

AIPMT Pre 2012

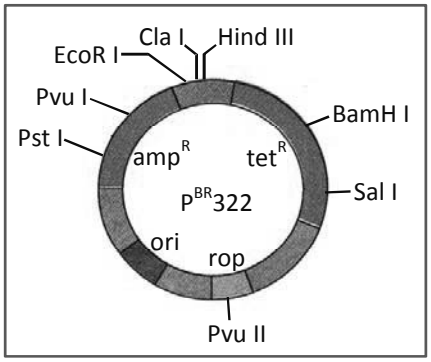
32. Which one is a true statement regarding DNA polymerase used in PCR ?
(1) It is isolated from a virus
(2) It remains active at high temperature
(3) It is used to ligate introduced DNA in recipient cells
(4) It serves as a selectable marker

BT0136

33. For transformation, micro-particles coated with DNA to be bombarded with gene gun are made up of :-
(1) Silicon or Platinum
(2) Gold or Tungsten
(3) Silver or platinum
(4) Platinum or zinc

BT0137

34. The figure below is the diagrammatic representation of the E.Coli vector pBR 322. Which one of the given options correctly identifies its certain component(s)?



(1) Hind III, ECoRI-selectable markers
(2) amp^R, tet^R-antibiotic resistance genes
(3) ori-original restriction enzyme
(4) rop-reduced osmotic pressure

BT0138

35. Consumption of which one of the following foods can prevent the kind of blindness associated with vitamin 'A' deficiency ?
(1) Golden rice
(2) Bt-Brinjal
(3) Flaver Savr 'tomato
(4) Canolla

BT0139

36. DNA or RNA segment tagged with a radiactive molecule is called :
(1) Clone (2) Plasmid
(3) Vector (4) Probe

BT0140

AIPMT Mains 2012

37. Which one of the following represents a palindromic sequence in DNA ?
(1) 5'–CATTAG–3'
3'–GATAAC–5'
(2) 5'–GATACC–3'
3'–CCTAAG–5'
(3) 5'–GAATTC–3'
3'–CTTAAG–5'
(4) 5'–CCAATG–3'
3'–GAATCC–5'

BT0141

38. In genetic engineering, the antibiotics are used :-

(1) as sequences from where replication starts

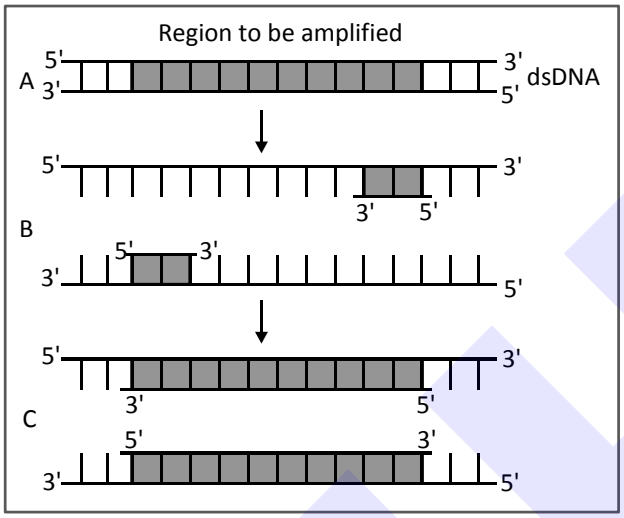
(2) to keep the cultures free of infection

(3) as selectable markers

(4) to select healthy vectors

BT0142

39. The figure below shows three steps (A,B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents?



Options :

(1) C-Extension in the presence of heat stable DNA polymerase

(2) A-Annealing with two sets of primers

(3) B-Denaturation at a temperature of about 98°C separating the two DNA strands

(4) A-Denaturation at a temperature of about 50°C

BT0143

40. Biolistics (gene-gun) is suitable for :

(1) Constructing recombinant DNA by joining with vectors

(2) DNA finger printing

(3) Disarming pathogen vectors

(4) Transformation of plants cells

BT0144

41. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells) :-

(1) an antifeedant

(2) a toxic protein

(3) both sense and anti-sense RNA

(4) a particular hormone

BT0145

42. The first clinical gene therapy was given for treating :

(1) Rheumatoid arthritis

(2) Adenosine deaminase deficiency

(3) Diabetes mellitus

(4) Chicken pox

BT0146

NEET(UG) 2013

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

(1) Inactivation of glycosidase enzyme in recombinant bacteria

(2) Non-recombinant bacteria containing beta-galactosidase

(3) Insertional inactivation of alpha-galactosidase in non-recombinant bacteria

(4) Insertional inactivation of beta-galactosidase in recombinant bacteria

BT0147

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

(1) Restriction mapping

(2) Centrifugation

(3) Polymerase chain reaction

(4) Electrophoresis

BT0148

AIPMT 2014

45. An analysis of chromosomal DNA using the Southern hybridization technique **does not** use:-

(1) Electrophoresis

(2) Blotting

(3) Autoradiography

(4) PCR

BT0153

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

(1) Bacterial artificial chromosome

(2) Yeast artificial chromosome

(3) Plasmid

(4) Cosmid

BT0154

47. The first human hormone produced by recombinant DNA technology is :-

(1) Insulin

(2) Estrogen

(3) Thyroxin

(4) Progesterone

BT0155

AIPMT 2015

48. The crops engineered for glyphosate are resistant/tolerant to :-

(1) Bacteria

(2) Insects

(3) Herbicides

(4) Fungi

BT0158

49. In Bt cotton, the Bt toxin present in plant tissue as pro-toxin is converted into active toxin due to:-

(1) Acidic pH of the insect gut

(2) Action of gut micro-organisms

(3) Presence of conversion factors in insect gut

(4) Alkaline pH of the insect gut

BT0159

50. Which body of the Government of India regulates GM research and safety of introducing GM organisms for public services ?

(1) Indian Council of Agricultural Research

(2) Genetic Engineering Approval Committee

(3) Research Committee on Genetic Manipulation

(4) Bio-safety committee

BT0160

Re-AIPMT 2015

51. The DNA molecules to which the gene of interest is integrated for cloning is called :

(1) Carrier (2) Transformer

(3) Vector (4) Template

BT0161

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

(1) Ligases

(2) Restriction enzymes

(3) Probes

(4) Selectable markers

BT0162

53. Golden rice is a genetically modified crop plant where the incorporated gene is meant for biosynthesis of :

(1) Vitamin A (2) Vitamin B

(3) Vitamin C (4) Omega 3

BT0163

54. The introduction of T-DNA into plants involves :

(1) Allowing the plant roots to stand in water

(2) Infection of the plant by *Agrobacterium tumefaciens*

(3) Altering the pH of the soil, then heat shocking the plants

(4) Exposing the plants to cold for a brief period

BT0164

NEET-I 2016

55. The two polypeptides of human insulin are linked together by :-
(1) Hydrogen bonds
(2) Phosphodiester bond
(3) Covalent bond
(4) Disulphide bridges

BT0177

56. Which of the following is not a feature of the plasmids ?
(1) Independent replication
(2) Circular structure
(3) Transferable
(4) Single - stranded

BT0178

57. The taq polymerase enzyme is obtained from :
(1) *Thermus aquaticus*
(2) *Thiobacillus ferroxidans*
(3) *Bacillus subtilis*
(4) *Pseudomonas putida*

BT0179

58. Which of the following is a restriction endonuclease?
(1) Hind II (2) Protease
(3) DNase I (4) RNase

BT0180

NEET-II 2016

59. Stirred-tank bioreactors have been designed for :
(1) availability of oxygen throughout the process
(2) ensuring anaerobic conditions in the culture vessel
(3) purification of product
(4) addition of preservatives to the product

BT0181

60. A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using :
(1) Polymerase-III
(2) Ligase
(3) *Eco* RI
(4) *Taq* polymerase

BT0182

61. Which of the following is **not** a component of downstream processing ?
(1) Preservation
(2) Expression
(3) Separation
(4) Purification

BT0183

62. Which of the following restriction enzymes produces blunt ends ?
(1) *Xho* I (2) *Hind* III
(3) *Sal* I (4) *Eco* RV

BT0184

63. Which kind of therapy was given in 1990 to a four year old girl with adenosine deaminase (ADA) deficiency ?
(1) Immunotherapy
(2) Radiation therapy
(3) Gene therapy
(4) Chemotherapy

BT0185

NEET(UG) 2017

64. The DNA fragments separated on an agarose gel can be visualised after staining with :
(1) Acetocarmine
(2) Aniline blue
(3) Ethidium bromide
(4) Bromophenol blue

BT0189

65. The process of separation and purification of expressed protein before marketing is called :
(1) Downstream processing
(2) Bioprocessing
(3) Postproduction processing
(4) Upstream processing

BT0190

66. A gene whose expression helps to identify transformed cell is known as :
(1) Vector
(2) Plasmid
(3) Structural gene
(4) Selectable marker

BT0191

NEET(UG) 2018

67. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes ?
(1) Retrovirus
(2) Ti plasmid
(3) λ phage
(4) pBR 322

BT0198

68. In India, the organisation responsible for assessing the safety of introducing genetically modified organisms for public use is
(1) Indian Council of Medical Research (ICMR)
(2) Council for Scientific and Industrial Research (CSIR)
(3) Research Committee on Genetic Manipulation (RCGM)
(4) Genetic Engineering Appraisal Committee (GEAC)

BT0199

69. A 'new variety of rice was patented by a foreign company though such varieties have been present in India for a long time. This is related to
(1) Co-667
(2) Sharbati Sonora
(3) Lerma Rojo
(4) Basmati

BT0200

70. Use of bioresources by multinational companies and organisations without authorisation from the concerned country and its people is called
(1) Bio-infringement
(2) Biopiracy
(3) Biodegradation
(4) Bioexploitation

BT0201

71. The correct order of steps in Polymerase Chain Reaction (PCR) is
(1) Extension, Denaturation, Annealing
(2) Annealing, Extension, Denaturation
(3) Denaturation, Extension, Annealing
(4) Denaturation, Annealing, Extension

BT0202

NEET(UG) 2019

72. Which of the following is **true** for Golden rice ?
(1) It is Vitamin A enriched, with a gene from daffodil
(2) It is pest resistant, with a gene from *Bacillus thuringiensis*
(3) It is drought tolerant, developed using *Agrobacterium* vector
(4) It has yellow grains, because of a gene introduced from a primitive variety of rice

BT0247

73. Which of the following features of genetic code does allow bacteria to produce human insulin by recombinant DNA technology?
(1) Genetic code is not ambiguous
(2) Genetic code is redundant
(3) Genetic code is nearly universal
(4) Genetic code is specific

BT0248

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

BT0249

75. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :

(1) Isopropanol

(2) Chilled ethanol

(3) Methanol at room temperature

(4) Chilled chloroform

BT0250

76. What triggers activation of protoxin to active Bt toxin of *Bacillus thuringiensis* in boll worm?

(1) Body temperature

(2) Moist surface of midgut

(3) Alkaline pH of gut

(4) Acidic pH of stomach

BT0251

NEET(UG) 2019 (Odisha)

77. Match the following enzymes with their functions:

(a) Restriction endonuclease	(i) Joins the DNA fragements
(b) Restriction exonuclease	(ii) Extends primers on genomic DNA template
(c) DNA ligase	(iii) Cuts DNA at specific position
(d) Taq polymerase	(iv) Removes nucleotides from the ends of DNA

Select the correct option from the following :

(1) a-iii, b-i, c-iv d-ii

(2) a-iii, b-iv, c-i, d-ii

(3) a-iv, b-iii, c-i, d-ii

(4) a-ii, b-iv, c-i, d-iii

BT0252

78. The two antibiotic resistance genes on vector pBR322 are :-

(1) Ampicillin and Tetracycline

(2) Ampicillin and Chloramphenicol

(3) Chloramphenicol and Tetracycline

(4) Tetracycline and Kanamycin

BT0253

79. Exploitation of bioresources of a nation by multinational companies without authorization from the concerned country is referred to as-

(1) Bioweapon

(2) Biopiracy

(3) Bioethics

(4) Biowar

BT0254

80. A selectable marker is used to:

(1) help in eliminating the non-transformants, so that the transformants can be regenerated

(2) identify the gene for a desired trait in an alien organism

(3) select a suitable vector for transformation in a specific crop

(4) mark a gene on a chromosome for isolation using restriction enzyme

BT0255

81. Given below are four statements pertaining to separation of DNA fragments using gel electrophoresis. Identify the incorrect statements.

(a) DNA is negatively charged molecule and so it is loaded on gel towards the Anode terminal

(b) DNA fragments travel along the surface of the gel whose concentration does not affect movement of DNA.

(c) Smaller the size of DNA fragment larger is the distance it travels through it.

(d) Pure DNA can be visualized directly by exposing UV radiation.

Choose correct answer from the options given below

(1) (a), (c) and (d) (2) (a), (b) and (c)

(3) (b), (c) and (d) (4) (a), (b) and (d)

BT0256

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

(1) DNA ligase (2) Endonuclease

(3) Exonuclease (4) Protease

BT0257

83. In RNAi, the genes are silenced using:
(1) ds-RNA
(2) ss-DNA
(3) ss-RNA
(4) ds-DNA

BT0258

NEET(UG) 2020

84. Which of the following statements is **not correct** ?
(1) Genetically engineered insulin is produced in *E-Coli*.
(2) In man insulin is synthesised as a proinsulin.
(3) The proinsulin has an extra peptide called C-peptide.
(4) The functional insulin has A and B chains linked together by hydrogen bonds.

BA0259

85. Match the organism with its use in biotechnology.

(a) *Bacillus thuringiensis*	(i) Cloning vector
(b) *Thermus aquaticus*	(ii) Construction of first rDNA molecule
(c) *Agrobacterium tumefaciens*	(iii) DNA polymerase
(d) *Salmonella typhimurium*	(iv) Cry proteins

Select the **correct** option from the following:

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(iv)	(i)	(ii)
(2)	(ii)	(iv)	(iii)	(i)
(3)	(iv)	(iii)	(i)	(ii)
(4)	(iii)	(ii)	(iv)	(i)

BT0260

86. Bt cotton variety that was developed by the introduction of toxin gene of *Bacillus thuringiensis* (Bt) is resistant to :
(1) Insect predators
(2) Insect pests
(3) Fungal diseases
(4) Plant nematodes

BA0261

87. The specific palindromic sequence which is recognized by EcoRI is :
(1) 5' - GGATCC - 3'
3' - CCTAGG - 5'
(2) 5' - GAATTC - 3'
3' - CTTAAG - 5'
(3) 5' - GGAACC - 3'
3' - CCTTGG - 5'
(4) 5' - CTTAAG - 3'
3' - GAATTC - 5'

BT0262

88. Match the following columns and select the **correct** option.

Column - I	**Column - II**
(a) Bt cotton	(i) Gene therapy
(b) Adenosine deaminase deficiency	(ii) Cellular defence
(c) RNAi	(iii) Detection of HIV infection
(d) PCR	(iv) *Bacillus thuringiensis*

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iv)	(i)	(ii)	(iii)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(ii)	(iii)	(iv)	(i)

BA0263

89. Identify the **wrong** statement with regard to Restriction Enzymes.
(1) Sticky ends can be joined by using DNA ligases.
(2) Each restriction enzyme functions by inspecting the length of a DNA sequence.
(3) They cut the strand of DNA at palindromic sites.
(4) They are useful in genetic engineering.

BT0264

90. The sequence that controls the copy number of the linked DNA in the vector, is termed :
(1) Recognition site
(2) Selectable marker
(3) Ori site
(4) Palindromic sequence

BT0265

91. Choose the **correct** pair from the following:
(1) Exonucleases : Make cuts at specific positions within DNA
(2) Ligases : Join the two DNA molecules
(3) Polymerases : Break the DNA into fragments
(4) Nucleases : Separate the two strands of DNA

BT0266

NEET(UG) 2020 (COVID-19)

92. First discovered restriction endonuclease that always cuts DNA molecule at a particular point by recognising a specific sequence of six base pairs is:
(1) EcoR1
(2) Adenosine deaminase
(3) Thermostable DNA polymerase
(4) Hind II

BT0267

93. In Recombinant DNA technology antibiotics are used :
(1) to keep medium bacteria-free
(2) to detect alien DNA
(3) to impart disease-resistance to the host plant
(4) as selectable markers

BT0268

94. Match the following techniques or instruments with their usage :

(a) Bioreactor	(i) Separation of DNA fragments
(b) Electrophoresis	(ii) Production of large quantities of products
(c) PCR	(iii) Detection of pathogen, based on antigen – antibody reaction
(d) ELISA	(iv) Amplification of nucleic acids

Select the correct option from following:
(1) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)
(2) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
(3) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
(4) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

BT0269

95. In a mixture, DNA fragments are separated by :-
(1) Bioprocess engineering
(2) Restriction digestion
(3) Electrophoresis
(4) Polymerase chain reaction

BT0270

96. Spooling is :-
(1) Amplification of DNA
(2) Cutting of separated DNA bands from the agarose gel
(3) Transfer of separated DNA fragments to synthetic membranes
(4) Collection of isolated DNA

BT0271

97. Select the correct statement from the following :
(1) Gel electrophoresis is used for amplification of a DNA segment.
(2) The polymerase enzyme joins the gene of interest and the vector DNA.
(3) Restriction enzyme digestions are performed by incubating purified DNA molecules with the restriction enzymes of optimum conditions.
(4) PCR is used for isolation and separation of gene of interest.

BT0272

98. RNA interference is used for which of the following purposes in the field of biotechnology ?
(1) to develop a plant tolerant to abiotic stresses
(2) to develop a pest resistant plant against infestation by nematode
(3) to enhance the mineral usage by the plant
(4) to reduce post harvest losses

BA0273

99. The laws and rules to prevent unauthorised exploitation of bio-resources are termed as-
(1) Biopatenting (2) Bioethics
(3) Bioengineering (4) Biopiracy

BA0274

NEET(UG) 2021

100. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out:
(1) RNA
(2) DNA
(3) Histones
(4) Polysaccharides

BT0275

101. Which of the following is a **correct** sequence of steps in a PCR (Polymerase Chain Reaction) ?
(1) Denaturation, Annealing, Extension
(2) Denaturation, Extension, Annealing
(3) Extension, Denaturation, Annealing
(4) Annealing, Denaturation, Extension

BT0276

102. DNA strands on a gel stained with ethidium bromide when viewed under UV radiation, appear as :
(1) Yellow bands
(2) Bright orange bands
(3) Dark red bands
(4) Bright blue bands

BT0277

103. When gene targetting involving gene amplification is attempted in an individual's tissue to treat disease, it is known as :
(1) Biopiracy
(2) Gene therapy
(3) Molecular diagnosis
(4) Safety testing

BA0278

104. Which of the following is **not** an application of PCR (Polymerase Chain Reaction) ?
(1) Molecular diagnosis
(2) Gene amplification
(3) Purification of isolated protein
(4) Detection of gene mutation

BT0279

105. Plasmid pBR322 has PstI restriction enzyme site within gene *amp*^{R} that confers ampicillin resistance. If this enzyme is used for inserting a gene for β-galactoside production and the recombinant plasmid is inserted in an *E.coli* strain
(1) it will not be able to confer ampicillin resistance to the host cell.
(2) the transformed cells will have the ability to resist ampicillin as well as produce β-galactoside.
(3) it will lead to lysis of host cell.
(4) it will be able to produce a novel protein with dual ability.

BT0280

106. A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DNA is :
(1) Degenerate primer sequence
(2) Okazaki sequences
(3) Palindromic Nucleotide sequences
(4) Poly(A) tail sequences

BT0281

107. With regard to insulin choose correct options.
(a) C-peptide is not present in mature insulin.
(b) The insulin produced by rDNA technology has C-peptide.
(c) The pro-insulin has C-peptide.
(d) A-peptide and B-peptide of insulin are interconnected by disulphide bridges.
Choose the **correct** answer from the options given below.
(1) (b) and (d) only
(2) (b) and (c) only
(3) (a), (c) and (d) only
(4) (a) and (d) only

BA0282

108. 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) Annealing (2) Extension
(3) Denaturation (4) Ligation

BT0283

109. For effective treatment of the disease, early diagnosis and understanding its pathophysiology is very important. Which of the following molecular diagnostic techniques is very useful for early detection?

(1) Western Blotting Technique

(2) Southern Blotting Technique

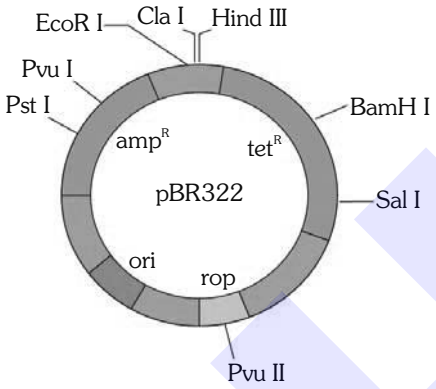
(3) ELISA Technique

(4) Hybridization Technique

BA0284

NEET(UG) 2021 (Paper-2)

110. The following figure shows the representation of



(1) Taq polymerase

(2) Ti plasmid

(3) Transformation

(4) Vector

BT0396

111. The first recombinant DNA was constructed by linking an antibiotic resistant gene with native plasmid of

(1) *Escherichia coli*

(2) *Salmonella typhimurium*

(3) *Bacillus thuringiensis*

(4) *Rhizobium japonicum*

BT0397

112. Genetically modified organisms (GMO) have been useful in many ways. Which is incorrect about genetic modification?

(1) They made crops more tolerant to drought.

(2) They enhance the nutritional value of food.

(3) They reduce the post harvest losses.

(4) They enhance reliance on chemical pesticides.

BA0398

113. A single stranded DNA or RNA, tagged with a radioactive molecule is allowed to hybridise to it complementary DNA in a clone of cells followed by detection using

(1) Polymerase chain reaction

(2) Biolistic or gene gun

(3) Autroradiography

(4) DNA fingerprinting

BA0399

114. In the process of recombinant DNA technology, the bioreactors are used in

(1) Downstream processing

(2) Amplification of gene of interest

(3) Separation of DNA fragments

(4) Production of large quantities of culture

BT0400

115. Hole seen in the cotton ball is due to

(1) Corn borer

(2) Ballworms

(3) Army worm

(4) *Bacillus thuringiensis*

BA0401

NEET(UG) 2022

116. Which one of the following statement is **not true** regarding gel electrophoresis technique ?

(1) The separated DNA fragments are stained by using ethidium bromide.

(2) The presence of chromogenic substrate gives blue coloured DNA bands on the gel.

(3) Bright orange coloured bands of DNA can be observed in the gel when exposed to UV light.

(4) The process of extraction of separated DNA strands from gel is called elution.

BT0402

117. Given below are two statements: one is labelled as

Assertion (A) and the other is labelled as **Reason (R)**.

Assertion (A): Polymerase chain reaction is used in DNA amplification

Reason (R): The ampicillin resistant gene is used as a selectable marker to check transformation.

In the light of the above statements, choose the **correct** answer from the options given below:

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is not correct but **(R)** is correct

(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

BT0403

118. Transposons can be used during which one of the following ?

(1) Gene silencing

(2) Autoradiography

(3) Gene sequencing

(4) Polymerase Chain Reaction

BA0404

119. In the following palindromic base sequences of DNA, which one can be cut easily by particular restriction enzyme ?

(1) 5' G A A T T C 3'; 3' C T T A A G 5'

(2) 5' C T C A G T 3'; 3' G A G T C A 5'

(3) 5' G T A T T C 3'; 3' C A T A A G 5'

(4) 5' G A T A C T 3'; 3' C T A T G A 5'

BT0405

120. Given below are two statements:

Statement I:

Restriction endonucleases recognise specific sequence to cut DNA known as palindromic nucleotide sequence.

Statement II:

Restriction endonucleases cut the DNA strand a little away from the centre of the palindromic site.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

(1) Both **Statement I** and **Statement II** are incorrect

(2) **Statement I** is correct but **Statement II** is incorrect

(3) **Statement I** is incorrect but **Statement II** is correct

(4) Both **Statement I** and **Statement II** are correct

BT0406

121. In gene therapy of Adenosine Deaminase (ADA) deficiency, the patient requires periodic infusion of genetically engineered lymphocytes because:

(1) Gene isolated from marrow cells producing ADA is introduced into cells at embryonic stages

(2) Lymphocytes from patient's blood are grown in culture, outside the body.

(3) Genetically engineered lymphocytes are not immortal cells.

(4) Retroviral vector is introduced into these lymphocytes.

BA0407

122. Statements related to human Insulin are given below.

Which statement(s) is/are **correct** about genetically engineered Insulin ?

(a) Pro-hormone insulin contain extra stretch of C-peptide

(b) A-peptide and B-peptide chains of insulin were produced separately in *E.coli*, extracted and combined by creating disulphide bond between them.

(c) Insulin used for treating Diabetes was extracted from Cattles and Pigs.

(d) Pro-hormone Insulin needs to be processed for converting into a mature and functional hormone.

(e) Some patients develop allergic reactions to the foreign insulin.

Choose the **most appropriate** answer from the options given below:

(1) (b)only

(2) (c) and (d) only

(3) (c), (d) and (e) only

(4) (a), (b) and (d) only

BA0408

123. Which of the following is **not** a desirable feature of a cloning vector ?

(1) Presence of a marker gene

(2) Presence of single restriction enzyme site

(3) Presence of two or more recognition sites

(4) Presence of origin of replication

BT0409

NEET(UG) 2022 (OVERSEAS)

124. Genetically engineered insulin for human is produced from :

(1) *Pseudomonas putida*

(2) *Bacillus thuringiensis*

(3) *Rhizobium meliloti*

(4) *Escherichia coli*

BA0410

125. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : Restriction enzyme is a type of endonuclease.

Reason (R) : Restriction enzyme cuts the two strands of DNA at specific positions within the DNA.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) **(A)** is not correct but **(R)** is correct

(2) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(4) **(A)** is correct but **(R)** is not correct

BT0411

126. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled us **Reason (R)**.

Assertion (A) : In rDNA technology non recombinants transformed bacteria grow on the medium containing ampicillin as well as medium containing tetracycline.

Reason (R) : Recombinant plasmids contain the foreign DNA or gene of interest.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) **(A)** is not correct but **(R)** is correct

(2) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are correct, but **(R)** is **not** the correct explanation of **(A)**

(4) **(A)** is correct but **(R)** is not correct

BT0412

127. The construction of the first recombinant DNA emerged from the possibility of linking a gene encoding antibiotic resistance with a native plasmid of which of the following organism?

(1) *Bacillus thuringiensis*

(2) *Salmonella typhimurium*

(3) *Agrobacterium tumefaciens*

(4) *Escherichia coli*

BT0413

128. In a cell, the separation of DNA strands is brougth about by the enzyme DNA helicase, whereas in PCR, the separation of DNA strands is due to :

(1) Two sets of Primers

(2) Taq DNA polymerase

(3) Deoxynucleotides

(4) High temperature

BT0414

129. Identify the properties of a good vector used in rDNA technology.

(a) It should have origin of replication supporting high copy number.

(b) It should have preferably more than '2' recoginition sites.

(c) the restriction sites in vector should be in the antibiotic resistant genes.

(d) It should have suitable marker genes.

(e) It should be easy to isolate and purify.

Choose the most appropriate answer from the options given below :

(1) (c), (d) and (e) only

(2) (a), (b) and (c) only

(3) (a), (c), (d) and (e) only

(4) (a), (c) and (e) only

BT0415

130. Given below two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : The nematode can not survive in a transgenic host which expresses specific interfering RNA.

Reason (R) : Nematode specific gene introduced in the host produces both sense and antisense complementary RNA which initiate RNA interference in the host cell.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) **(A)** is not correct but **(R)** is correct

(2) Both **(A)** and **(R)** arc correct and **(R)** is the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(4) **(A)** is correct but **(R)** is not correct

BA0416

131. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : In human beings. Insulin is synthesized as a pro-hormone which needs to be processed before it becomes fully mature and functional.

Reason (R) : The extra stretch of C-peptide is to be removed from A-peptide and B-peptide chain of insulin.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) **(A)** is not correct but **(R)** is correct

(2) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(4) **(A)** is correct but **(R)** is not correct

BA0417

Re-NEET(UG) 2022

132. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) :

When a particular restriction enzyme cuts strand of DNA, overhanging stretches or sticky ends are formed.

Reason (R) :

Some restriction enzymes cut the strand of DNA a little away from the centre of palindromic site.

In the light of the above statements, choose the **correct answer** from the options given below :

(1) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(2) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(3) **(A)** is correct but **(R)** is not correct

(4) **(A)** is not correct but **(R)** is correct

BT0418

133. Separation of DNA, fragments is done by a technique known as :

(1) Polymerase Chain Reaction

(2) Recombinant technology

(3) Southern blotting

(4) Gel electrophoresis

BT0419

134. Match **List-I** with **List-II** :

List-I	**List-II**
(a) Gene gun	(i) Replacement of a faulty gene by a normal healthy gene
(b) Gene therapy	(ii) Used for transfer of gene
(c) Gene cloning	(iii) Total DNA in the cells of an organism
(d) Genome	(iv) To obtain indentical copies of a particular DNA molecule

Choose the **correct answer** from the options given below :

(1) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(2) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)

(3) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

(4) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

BA0420

135. The enzyme (a) is needed for isolating genetic material from plant cells and enzyme (b) for isolating genetic material from fungus. Choose the correct pair of options from the following :

(1) (a) Cellulase (b) Protease

(2) (a) Cellulase (b) Chitinase

(3) (a) Chitinase (b) Lipase

(4) (a) Cellulase (b) Lipase

BT0421

136. Milk of transgenic 'Cow Rosie' was nutritionally more balanced product for human babies than natural cow milk because it contained:

(1) Human protein α–1–antitrypsin

(2) Human alpha–lactalbumin

(3) Human insulin–like growth factor

(4) Human enzyme Adenosine Deaminase (ADA)

BA0422

137. Refer to the following statements for agarose-gel electrophoresis :

(a) Agarose is a natural polymer obtained from sea-weed.

(b) The separation of DNA molecules in agarose-gel electrophoresis depends on the size of DNA.

(c) The DNA migrates from negatively-charged electrode to the positively-charged electrode

(d) The DNA migrates from positively-charged electrode to the negatively-charged electrode.

Choose **the most appropriate answer** from the options given below :

(1) (a) and (b) only

(2) (a), (b) and (c) only

(3) (a), (b) and (d) only

(4) (b), (c) and (d) only

BT0423

EXERCISE-II (Previous Year Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**1**	**2**	**1**	**1**	**3**	**4**	**4**	**3**	**4**	**2**	**3**	**3**	**2**	**4**	**2**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**1**	**4**	**4**	**3**	**3**	**2**	**4**	**4**	**4**	**2**	**1**	**1**	**3**	**2**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**2**	**2**	**2**	**2**	**1**	**4**	**3**	**3**	**1**	**4**	**3**	**2**	**4**	**4**	**4**
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**3**	**1**	**3**	**4**	**2**	**3**	**2**	**1**	**2**	**4**	**4**	**1**	**1**	**1**	**2**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	**2**	**4**	**3**	**3**	**1**	**4**	**1**	**4**	**4**	**2**	**4**	**1**	**3**	**2**	**2**
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	**3**	**2**	**1**	**2**	**1**	**4**	**3**	**1**	**4**	**3**	**2**	**2**	**2**	**1**	**3**
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	**2**	**4**	**4**	**2**	**3**	**4**	**3**	**2**	**1**	**2**	**1**	**2**	**2**	**3**	**1**
Que.	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans.	**3**	**3**	**3**	**3**	**4**	**2**	**4**	**3**	**4**	**2**	**2**	**1**	**1**	**1**	**4**
Que.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
Ans.	**3**	**1**	**3**	**4**	**2**	**3**	**2**	**4**	**3**	**2**	**2**	**1**	**4**	**1**	**2**
Que.	136	137													
Ans.	**2**	**2**													

EXERCISE-III(A) NCERT BASED QUESTIONS

1. The science, which deals with techniques of using live organisms or enzymes from organism to produce products and processes useful to human is :
(1) Genetics (2) Biotechnology
(3) Bioinformatics (4) None of these

BT0285

2. A restriction endonucleases which always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs is :
(1) ECOR I (2) DNA polymerase
(3) Hae-III (4) All of these

BT0286

3. The first letter of the name of Restriction endonuclease came from the
(1) Genus of organism
(2) Species of organism
(3) Family of organism
(4) Class of organism

BT0287

4. Autonomously replicating circular extra chromosomal DNA of bacteria is :
(1) Plastid
(2) Nucleus
(3) Plasmid
(4) None of these

BT0288

5. The specific DNA sequence in a chromosome which is responsible for initiation of replication is :
(1) Cloning region
(2) Termination region
(3) Initiation region
(4) Origin of replication

BT0289

6. Which of the following enzymes is known as 'genetic glue'?
(1) DNA polymerase
(2) Alkaline phosphatase
(3) DNA ligase
(4) All of the above

BT0290

7. pBR322 has two antibiotic resistance genes, they are :
(1) Streptomycin and Ampicillin resistant gene
(2) Chloromycetin and tetracycline resistant gene
(3) Tetracycline and neomycin resistant genes
(4) Ampicillin and tetracyclin resistant genes

BT0291

8. To isolate DNA from the plant cells we have to break the wall this is done by :
(1) Lysozyme
(2) Cellulase
(3) Chitinase
(4) Invertase

BT0292

9. Restriction enzymes belong to a larger class of enzymes called :
(1) Cellulases
(2) Hydrolases
(3) Polymerases
(4) Nucleases

BT0293

10. The construction of the first recombinant DNA was done by ?
(1) Stanley cohen and Herbert Boyer
(2) Nathan's and Smith
(3) Maeselson and Stahl
(4) Allec Jeffreys

BT0294

11. EcoRI recognises palindromic sequence
(1) $^{5'}$GGGCCC$^{3'}$
$^{3'}$CCCGGG
(2) $^{5'}$-GAATTC-$^{3'}$
^{3}-CTTAAG-$^{5'}$
(3) ^{5}-AAGCTT$^{3'}$
^{3}-TTCGAA-^{5}
(4) None of the above

BT0295

12. The enzymes responsible for restricting the growth of bacteriophage in *E-coli* were isolated in 1963, these enzyme are :
(1) DNA ligases
(2) Alkaline phosphatases
(3) DNA polymerases
(4) Restriction endonuclease

BT0296

13. Vector which is commonly used to transfer foreign gene in a crop plant is :
(1) Plasmids of *Salmonella*
(2) λ bacterio phage vector
(3) Ti plasmid of *Agrobacterium tumifaciens*
(4) None of the above

BT0297

14. Father of genetic engineering is :
(1) Paul Berg (2) Nathans
(3) Herbert Boyer (4) Stanley Cohen

BT0298

15. A definition of biotechnology that encompasses both traditional view and modern view are given by :
(1) European forum on Biotechnology
(2) European focus on Biotechnology
(3) European Federation of Biotechnology
(4) European Centre of Biotechnology

BT0299

16. Which one of the following is must in Genetic engineering -
(1) Restriction endonuclease + DNA ligase
(2) Restriction exonuclease + DNA polymerase
(3) Alkaline phosphate + DNA Ligase
(4) RNA polymerase + DNA polymerase

BT0300

17. Roman numbers following the names of restriction endonuclease indicate :
(1) The order in which the enzymes were isolated from that strain of bacteria
(2) strain of bacteria
(3) the order in which genus is taken to isolate the enzyme
(4) none of the above

BT0301

18. Exonuclease removes nucleotides from
(1) Specific positions
(2) the ends of the DNA
(3) any where in DNA
(4) All the above

BT0302

19. In a chromosome there is a specific DNA sequence which is responsible for initiating replication is :
(1) Ori
(2) Palindromic sequence
(2) Initiation sequence
(4) Promoter sequence

BT0303

20. First recombinant DNA was made by Stanley Cohen and Herbert Boyer in :
(1) 1968 (2) 1970
(3) 1972 (4) 1974

BT0304

21. The first restriction endonuclease discovered, was
(1) Eco RI
(2) Sam I
(3) Bam HI
(4) Hind II

BT0305

22. In the vector pBR322 there is
(1) One selectable marker
(2) Two selectable markers
(3) Three selectable markers
(4) None of the above

BT0306

23. When the isolation of genetic material is done the RNA can be removed by treatment with :
(1) Protease
(2) Chitinase
(3) Ribonuclease
(4) Deoxyribonuclease

BT0307

24. Knife of DNA :
(1) DNA - ligase
(2) Restriction endonuclease
(3) Exonuclease
(4) Peptidase

BT0308

25. The enzymes, which remove nucleotides from the ends of the DNA are :
(1) Exonuclease
(2) Endonuclease
(3) Cellulase
(4) Hydrolase

BT0309

26. Group of letters that form the same words when read both forward and backward is called :
(1) Palindrome
(2) Same words
(3) Opposite words
(4) None of the above

BT0310

27. Which type of ends are produced by EcoRI?
(1) Blunt ends
(2) Sticky ends
(3) Both (1) and (2)
(4) None of the above

BT0311

28. The sequence which is responsible for controlling the copy number of the linked DNA is :
(1) Coding sequence
(2) Promoter sequence
(3) Terminator sequence
(4) Ori

BT0312

29. Apart from DNA in the bacterial nucleoid, there is a circular extrachromosomal DNA in a bacterial cell called :
(1) Plasmid
(2) Mesosomes
(3) Chromosome
(4) None of these

BT0313

30. The stickiness of the ends, facilitates the action of enzyme :
(1) DNA ligase
(2) DNA polymerase
(3) Alkaline phosphatase
(4) All of the above

BT0314

31. Two enzymes responsible for restricting the growth of bacteriophage in *E.coli* were isolated in 1963, one of these cut DNA, while other :
(1) Add propyl group to DNA
(2) Add ethyl group to DNA
(3) Add methyl group to DNA
(4) None of the above

BT0315

32. The linking of antibiotic resistant gene in the plasmid vector become possible with the enzyme :
(1) Restriction endonuclease
(2) DNA ligase
(3) DNA polymerase
(4) RNA polymerase

BT0316

33. If any protein encoding gene is expressed in a hetero logous host then protein is known as :
(1) Recombinant gene
(2) Recombinant protein
(3) Selectable marker
(4) Homogenous protein

BT0317

34. The normal *E-coli* cell carries resistance gene against:
(1) Ampicillin
(2) Chloramphenicol
(3) Tetracycline
(4) None of the above

BT0318

35. Taq polymerase is used in, polymerase chain reaction, because :
(1) It becomes inactive at high temperature
(2) It makes other enzyme active at high temperature
(3) It remains active during high temperature
(4) It is obtained from thermostable virus.

BT0319

36. The vessels, where large volumes of culture can be processed are :
(1) Bioreactors
(2) Biovessels
(3) Biocontainers
(4) All of above

BT0320

37. Small chemically synthesised oligonucleotides that are complementary to the regions of DNA at 3' end used in PCR are :
(1) Primers
(2) Dimers
(3) Small strands
(4) Large fragments

BT0321

38. Bombardment of high velocity micro-particles of gold or tungsten coated with DNA on target cells is :
(1) Biolistics
(2) Micro-injection
(3) Electroporation
(4) Bombing

BT0322

39. In micro injection :
(1) DNA is bombarded on target cells
(2) DNA is placed through a vector
(3) DNA is directly injected into the nucleus of animal cell
(4) None of the above

BT0323

40. Most common matrix is agarose a natural polymer used in gel electrophoresis is extracted from :
(1) an animal
(2) a fungus
(3) Sea weeds
(4) None of these

BT0324

41. *Agrobacterium tumifaciens* a pathogen transform normal plant cells into a tumor, similarly in animals the normal cells transformed into cancerous cells by:
(1) Retro viruses (2) DNA viruses
(3) Ribo viruses (4) None of these

BT0325

42. Insertional inactivation results into inactivation of which enzyme ?
(1) Transacetylase
(2) Permease
(3) Taq polymerase
(4) β-galactosidase

BT0326

43. If the bacterium does not have any insert, then the presence of chromogenic substrate, it gives :
(1) Red coloured colonies
(2) Colourless colonies
(3) Blue colonies
(4) Green colonies

BT0327

44. To make cell competent to take up DNA, heat shock is given to cells, the temperature of shock is :
(1) 30°C (2) 42°C
(3) 60°C (4) 90°C

BT0328

45. In gel electrophoresis technique the DNA fragments are forced to move through a medium towards :
(1) Anode
(2) Cathode
(3) Both (1) and (2)
(4) None of the above

BT0329

46. Which one is not a basic step in genetically modifying an organism
(1) Identification of DNA with desirable genes
(2) Introduction of the identified DNA into the host
(3) Introduction of unidentified DNA into the host
(4) Maintenance of introduced DNA in the host and transfer of the DNA to its progeny.

BT0330

47. The most commonly used bioreactors are of
(1) Simple stirring type
(2) Sparged stirring type
(3) Both (1) and (2)
(4) None of the above

BT0331

48. Downstream processing is :
(1) Process of separation of DNA fragments
(2) Process of joining the vector and the host DNA
(3) Process including separation and purification of the product
(4) Process of transferring DNA.

BT0332

49. Taq. polymerase is obtained from :
(1) *Bacillus thuriengiensis*
(2) *Thermus aquaticus*
(3) *Salmonella typhimurium*
(4) *Eischerichia coli*

BT0333

50. To denature the DNA template in PCR it is heated to
(1) 70°C (2) 54°C (3) 80°C (4) 94°C

BT0334

51. Alternative selectable markers developed to differentiate non-recombinants from recombinants on the basis of :
(1) Ability of separate them according to size
(2) Ability to produce colour in the presence of a chromogenic substrate
(3) Ability to not produce colour
(4) None of the above

BT0335

52. If DNA is inserted within the coding sequence of β-galactosidase enzyme then
(1) Non-recombinants will give blue coloured colonies in presence of chromogenic substrate
(2) Recombinant will give blue coloured colonies in presence of chromogenic substrate
(3) Both recombinants and non-recombinants give blue colour
(4) Non-recombinants do not produce colour due to insertional inactivation.

BT0336

53. In gel electrophoresis the DNA fragments separate according to size (smaller the fragment size, the faster it moves) this effect is called :
(1) Sieving effect
(2) Movement effect
(3) Size effect
(4) Spooling

BT0337

54. Extraction, purification and packaging of products is collectively known as :
(1) Upstream processing
(2) Distillation
(3) Downstream processing
(4) Genetic engineering

BT0338

55. You have three copies of a particular DNA molecule what technique would you use to make more copies of the molecule?
(1) Gel electrophoresis
(2) Sequencing
(3) PCR
(4) Restriction fragment analysis

BT0339

56. Ti plasmid is present in :
(1) *E.coli*
(2) *Agrobacterium tumefaciens*
(3) *Agrobacterium orifaciens*
(4) *Vibrio cholera*

BT0340

57. DNA cannot pass through cell membrane as it is :
(1) hydrophilic (2) hydrophobic
(3) lipophilic (4) All the above

BT0341

58. Which type of bioreactor is usually cylindrical or with a curved base to facilitate the mixing of the contents?
(1) Sparged tank bioreactor
(2) Stirred tank bioreactor
(3) Both (1) and (2)
(4) None of the above

BT0342

59. In PCR-technology primer is a :
(1) Small chemically synthesized oligonucleotide that are complementary to region of DNA
(2) Large chemically synthesized oligonucleotide that are identical to region of DNA
(3) Small segment of RNA
(4) None of these

BT0343

60. In gel electrophoresis the DNA fragment separate according to their size through sieving effect, which is provided by :
(1) Agarose gel
(2) Nylone membrane
(3) Polyethylene glycol
(4) Ethidium Bromide

BT0344

61. Which of the following method of vectorless gene transfer is suitable for plants ?
(1) Biolistics method
(2) Micro injection
(3) Liposome mediated
(4) Electroporation

BT0345

62. In gel electrophoresis, separated bands of DNA are cut out from the agarose gel and extracted from the gel pieces, This step is known as :
(1) Blotting (2) Elution
(3) Cloning (4) Tagging

BT0346

63. Which enzyme is used in PCR technique ?
(1) Thermostable DNA polymerase
(2) Thermostable RNA polymerase
(3) Thermostable ligase
(4) Thermostable vector

BT0347

64. Which of the following is used to deliver desirable gene in to animal cell :
(1) Disarmed retrovirus
(2) Disarmed agrobacterium
(3) Disarmed *E.coli*
(4) Disarmed plant pathogen

BT0348

65. *Agrobacterium tumifaciencs*, a pathogen of several dicot plants is able to deliver a piece of DNA and it is known as :
(1) R-DNA (2) S-DNA
(3) M-DNA (4) T-DNA

BT0349

66. A transgenic food crop, which may help in solving the problem of night blindness in developing countries is :
(1) Bt soyabean
(2) Golden rice
(3) Flavr savr tomatoes
(4) Starlink maize

BT0350

67. Bacterium *Bacillus thuringiensis* is widely used in contemporary biology as
(1) Source of industrial enzyme
(2) Indicator of water pollution
(3) Insecticide
(4) Agent for production of dairy products.

BT0351

68. *Bacillus thuringiensis* is a :
(1) Bacterium
(2) Protozoa
(3) Fungus
(4) Virus

BT0352

69. GEAC stands for :
(1) Gene evaluation approval committee
(2) Genetic engineering approval committee
(3) Genetic engineering applied committee
(4) Gene enhancement approval committee

BT0353

70. Conventional methods to diagnose a disease are :
(1) Serum and urine analysis
(2) PCR
(3) ELISA
(4) All of the above

BT0354

71. The first transgenic cow, which produced human protein enriched milk was named :
(1) Andy (2) Dolly
(3) Rosie (4) Dumpy

BT0355

72. Milk of transgenic cow 'Rosie' contains a substance that was nutritionally more balanced product for human babies is :
(1) α-lactalbumin (2) β-lactalbumin
(3) γ-lactalbumin (4) δ-lactalbumin
BT0356

73. Which peptide is not present in the mature insulin and is removed during maturation into insulin?
(1) A-peptide
(2) B-peptide
(3) C-peptide
(4) Both (1) and (2)
BT0357

74. Two polypeptide chains of insulin are linked together by :
(1) disulphide bonds
(2) hydrogen bonds
(3) Phosphodiester bonds
(4) Glycosidic bonds
BT0358

75. 'Flavr Savr' is a transgenic variety of :
(1) Potato (2) Tomato
(3) Soyabean (4) Rice
BT0359

76. Golden rice is enriched in :
(1) Vitamin C (2) Vitamin D
(3) Vitamin A (4) Vitamin E
BT0360

77. For the control of the cotton bollworms, which one of the genes is useful ?
(1) Cry 1 Ac (2) Cry 1 Ab
(3) Cry 1 Ad (4) All of these
BT0361

78. Process involving silencing of a specific mRNA due to a complementary dsRNA molecule is called :
(1) Transcription
(2) RNA interference
(3) DNA interference
(4) None of these
BT0362

79. *Meloidegyne incognitia* which infects the roots of tobacco plants causing a great reduction in yield is a :
(1) Nematode (2) Bacterium
(3) Virus (4) Alga
BT0363

80. Toxin present in *Bacillus thuringiensis* does not kill the bacterium because it is inactive form what makes it active inside the insect?
(1) the alkaline pH of the gut, which solubilises the crystals
(2) the acid pH of the gut
(3) the neutral pH of the gut
(4) All of the above
BT0364

81. Crystals of Bt toxin produced by some bacteria do not kill the bacteria themselves because :
(1) bacteria are resistant to the toxin
(2) toxin is immature
(3) toxin is inactive
(4) bacteria enclose toxin in a special sac
BT0265

82. Which one of the following statements about genetically engineered insulin is incorrect.
(1) *E.coli* is used for producing humulin
(2) Chains A, B were produced separately
(3) Eli lilly company prepared it for first time
(4) Genetically engineered insulin has C-peptide
BT0366

83. Infection by pathogen can be detected by the presence of antigens or by detecting the antibodies synthesised against the pathogen, on this principle a test is based which is ?
(1) PCR
(2) ELISA
(3) Both (1) and (2)
(4) None of the above
BT0367

84. Indian parliament recently cleared, which amendment of the Indian patents bill,
(1) First amendment
(2) Second amendment
(3) Third amendment
(4) Fourth amendment
BT0368

85. How many documented varities of basmati rice distinct for its unique aroma and flavour are grown in India?
(1) 27 varieties (2) 25 varieties
(3) 28 varieties (4) 26 varieties
BT0369

86. Over 95 percent of all existing transgenic animals are :
(1) Pigs (2) Cows (3) Fish (4) Mice
BT0370

87. The organisation set up for making decisions regarding the validity of GM research and the safety of introducing GM organism for public services is :
(1) Genetic engineering approval committee
(2) Genetic engineering advanced company
(3) Genetic engineering applied committee
(4) None of these
BT0371

88. Use of bio-resources by multinational companies and other organisations without proper autorisation from the countries and people concerned without compensatory payment is called :
(1) Biotheft
(2) Biopatent
(3) Biopiracy
(4) None of the above
BT0372

89. Which animal is being used to test the safety of polio vaccine?
(1) Transgenic mice (2) Transgenic pig
(3) Transgenic cow (4) Transgenic cat
BT0373

90. Cry1Ab gene produces proteins which control?
(1) Bollworms
(2) Corn borer
(3) Both (1) and (2)
(4) None of the above
BT0374

91. Nematode-specific genes were introduced into the host plant (tabacco plant) by using which vector ?
(1) Plasmid vector
(2) Cosmid vector
(3) Bacteriophage vector
(4) BAC
BT0375

92. Which one of the following statements are true regarding genetic modifications ?
(1) Genetic modifications reduced reliance on chemical pesticides
(2) Genetic modifications has enhanced nutritional value of food.
(3) Genetic modifications made crops more tolerant to abiotic stresses.
(4) All are correct
BT0376

93. Critical research areas of biotechnology are:
(1) providing the best catalyst in the form of improved organism usually a microbe or pure enzyme.
(2) Creating optimal conditions through engineering for a catalyst to act.
(3) Down stream processing technologies to purify the protein/organic compound.
(4) All the above
BT0377

94. Bacterium genetically engineered for cleaning oil spills is :
(1) *Eischerichia coli*
(2) *Pseudomonas putida*
(3) *Salmonella typhimurium*
(4) *Agrobacterium tumifaciens*
BT0378

95. Bacterium which is known as 'Super bug' is:
(1) *Pseudomonas putida*
(2) *Salmonella*
(3) *Eischerichia*
(4) *Agrobacterium*
BT0379

96. Animals those have had their DNA manipulated to possess and express an extra (foreign) gene are known as :
(1) Transgenic animals
(2) Genetically modified animals
(3) Both (1) and (2)
(4) None of the above
BT0380

97. When cut by the restriction enzyme, the DNA fragments can be joined together using :
(1) DNA polymerase
(2) DNA ligase
(3) Alkaline phosphatase
(4) DNA gyrase
BT0381

98. Genetically engineered human insulin is made in
(1) Fungus (2) Protista
(3) Plants (4) Bacterium

BT0382

99. Genetically engineered bacteria are being used in commercial production of :
(1) melatonin (2) testosterone
(3) thyroxine (4) human insulin

BT0383

100. Insulin consists of two short polypeptide chains, which are linked together by?
(1) Sulphide bridges
(2) Peptide bridges
(3) Chloride bridges
(4) Disulphide bridges

BT0384

101. *Meloidegyne incognitia* infects the root of which plant ?
(1) Potato (2) Soyabean
(3) Tobacco (4) Tomato

BT0385

102. Genetics modified crops (GMC) are useful in agriculture because :
(1) They are more tolerant to abiotic stresses
(2) They increase reliance on chemical pesticide
(3) They have reduced nutritional value
(4) All the above

BT0386

103. The protien encoded by the gene cryIAc and cryIIAb, controls :
(1) Cotton bollworm (2) Corn borer
(3) Cotton borer (4) All the above

BT0387

104. A nematode *Meloidegyne incognitia* infects the root of tobacco plant and causes a great reduction in yield. A novel strategy was adopted to prevent this infection which was based on the process of :
(1) DNA interference
(2) RNA interference
(3) PCR technique
(4) DNA test

BT0388

105. In RNA interference (RNAi) :
(1) The silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevent translation of the mRNA :
(2) The silencing of a specific mRNA due to dsDNA
(3) The silencing of a specific mRNA due to tRNA
(4) All the above

BT0389

106. Transgenic animals produces biological product such as α-1-antitrypsin, which is used to treat :
(1) Emphysema
(2) Cystic fibrosis
(3) Phenyl ketonuria
(4) Sickle cell anaemia

BT0390

107. The first transgenic cow was 'Rosie', produces :
(1) Human protein-enriched milk (α-lactabumin)
(2) Human protein α-1 antitrypsin riched milk
(3) Human protein enriched milk (insulin)
(4) All the above

BT0391

108. Transgenic mice are being developed for use in :
(1) Testing the safety of polio vaccines before they are used on human
(2) Molecular diagnosis of diseases
(3) Production of human protein enriched milk
(4) Production of human insulin

BT0392

109. The technique that serves the purpose of early diagnosis of disease or pathogen :
(1) Recombinant DNA technology
(2) Polymerase chain reaction (PCR)
(3) Enzyme linked immuno sorbent assay (ELISA)
(4) All the above

BT0393

110. Transgenic tobacco which is developed through RNA interference, prevents the infection of :
(1) A nematode - *Meloidegyne incognitia*
(2) A bacterium - *Pseudonomonas putida*
(3) A fungi - *Tricoderma*
(4) An insect

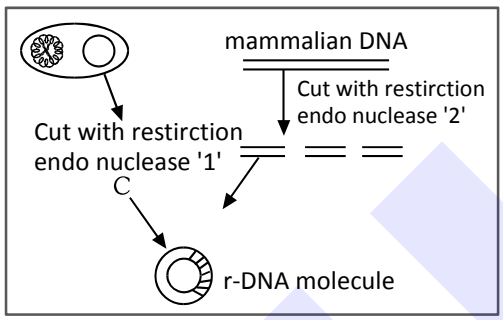
BT0394

111. The first clinical gene therapy was given to a 4-year old girl with ADA deficiency in :
(1) 1984 (2) 1986
(3) 1992 (4) 1990

BT0395

EXERCISE-III(B) (ANALYTICAL QUESTIONS)

112. The basic procedure involved in the synthesis of recombinant DNA molecule is depicted below. The mistake in the procedure is :-



(1) Enzyme polymerase is not included
(2) The mammalian DNA is shown double stranded
(3) Only one fragment is inserted
(4) Two different restriction enzymes are used

BT0204

113. Production of a human protein in bacteria by genetic engineering is possible because
(1) Bacterial cell can carry out the RNA splicing reactions
(2) The mechanism of gene regulation is identical in humans and bacteria
(3) The human chromosome can replicate in bacterial cell
(4) The genetic code is universal

BT0205

114. If a recombinant DNA bearing gene for ampicillin resistance if transferred into *E.Coli* cells and the host cells are spread on agar plates containing ampicillin, then :-
(1) both transformed and untransformed recipient cells will die
(2) both transformed and untrasformed recipient cell will be grow
(3) tranformed recipient cells will grow and untransformed recipient cells will die
(4) transformed recipient cells will die and untransformed recipient cells will grow

BT0206

115. If hemoglobin (Hb) of a normal individual and a sickle-cell patient are run in electrophoretic field, they will show :-
(1) same mobilities
(2) different mobilities
(3) Hb of patient will not move at all
(4) Hbs are immobile

BT0207

116. Introduction of food plants developed by genetic engineering is not desirable because–
(1) Economy of developing countries may suffer.
(2) These products are less tasty as compared to the already existing products.
(3) This method is costly.
(4) There is danger of coming viruses and toxins with introduced crop.

BT0208

117. Which one of the following is a correct statement
(1) "Bt" in "Bt-cotton" indicates that it is a genetically modified organism produced through biotechnology
(2) Somatic hybridization involves fusion of two complete plant cells carrying desired genes.
(3) The anticoagulant hirudin is being produced from transgenic **Brassica napus** seeds.
(4) "Flavr Savr" variety of tomato has enhanced the production of ethylene which improves its taste.

BT0209

118. Which of the following tools of recombinant DNA technology is incorrectly paired with its use –
(1) restriction enzyme - Production of RFLPs
(2) DNA ligase-that cuts DNA, creating the sticky ends
(3) DNA polymerase - used in a polymerase chain reaction to amplify section of DNA
(4) reverse transcriptase - production of cDNA from mRNA

BT0210

119. Select the incorrect statement for continuous culture system–
(1) In this used medium is drained out from one side while fresh medium is added from other side.
(2) In this cells are maintained in their physiologically most active lag phase of growth.
(3) It produces larger biomass.
(4) It shows higher yields of desired product.

BT0211

120. In r-DNA technology or genetic engineering elution means –
(1) Remove the DNA from centrifuge tube after centrifugation
(2) The separated band of DNA are cut out from the gel and extracted from the gel piece
(3) Separation of the recombinant protein from recombinant cell
(4) Insertion of recombinant DNA into the host cell

BT0212

121. An example of gene therapy is
(1) Production of injectable Hepatitis–B vaccine
(2) Production of vaccines in food crops like potatoes which can be eaten
(3) Introduction of gene for adenosine deaminase in persons suffering from severe combined immuno-deficiency (SCID)
(4) Production of test tube babies by artificial insemination and implantation of fertilized eggs

BT0213

EXERCISE-III — ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**1**	**1**	**3**	**4**	**3**	**4**	**2**	**4**	**1**	**2**	**4**	**3**	**1**	**3**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**1**	**2**	**1**	**3**	**4**	**2**	**3**	**2**	**1**	**1**	**2**	**4**	**1**	**1**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**3**	**2**	**2**	**4**	**3**	**4**	**1**	**1**	**3**	**3**	**1**	**4**	**3**	**2**	**1**
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**3**	**3**	**3**	**2**	**4**	**2**	**1**	**1**	**3**	**3**	**2**	**1**	**3**	**1**	**1**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	**1**	**2**	**1**	**1**	**4**	**2**	**3**	**1**	**2**	**1**	**3**	**1**	**3**	**1**	**2**
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	**3**	**1**	**2**	**1**	**1**	**3**	**4**	**2**	**2**	**1**	**4**	**1**	**3**	**1**	**2**
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	**1**	**4**	**4**	**2**	**1**	**3**	**2**	**4**	**4**	**4**	**3**	**1**	**1**	**2**	**1**
Que.	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans.	**1**	**1**	**1**	**4**	**1**	**4**	**4**	**4**	**3**	**2**	**4**	**3**	**2**	**2**	**2**
Que.	121														
Ans.	**3**														