

BIOTECHNOLOGY : PRINCIPLES AND PROCESSES

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
2. A restriction endonucleases which always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs is :
(1) Hind-II (2) Pst I
(3) Hae-III (4) All of these
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
4. Autonomously replicating circular extra chromosomal DNA of bacteria is :
(1) Plastid (2) Nucleus
(3) Plasmid (4) None of these
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
6. Which of the following reproduction preserves the genetic informations ?
(1) Asexual reproduction
(2) Sexual reproduction
(3) Both (1) and (2)
(4) None of these
7. 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.
8. The vessels, where large volumes of culture can be processed are :
(1) Bioreactors (2) Biovessels
(3) Biocontainers (4) All of above
9. Which of the following enzymes is known as 'genetic glue'?
(1) DNA polymerase
(2) Alkaline phosphatase
(3) DNA ligase
(4) All of the above
10. 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
11. 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
12. 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
13. 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
14. 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

- 15.** 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
- 16.** *Agrobacterium tumefaciens* 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
- 17.** Insertional inactivation results into inactivation of which enzyme ?
- (1) Transacetylase
(2) Permease
(3) Taq polymerase
(4) β -galactosidase
- 18.** 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
- 19.** 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
- 20.** 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
- 21.** Restriction enzymes belong to a larger class of enzymes called :
- (1) Cellulases (2) Hydrolases
(3) Polymerases (4) Nucleases
- 22.** 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.
- 23.** 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
- 24.** 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
- 25.** 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.
- 26.** EcoRI recognises palindromic sequence
- (1) $5'GGGCCC^3$ (2) $5'-GAATTC-3'$
 $3'CCCGGG$ $3'-CTTAAG-5'$
(3) $5'-AAGCTT^3$ (4) None of the above
 $3'-TTCGAA-5'$
- 27.** 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
- 28.** 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 tumefaciens*
(4) None of the above
- 29.** Father of genetic engineering is :
- (1) Paul Berg
(2) Nathans
(3) Herbert Boyer
(4) Stanley Cohen

- 30.** 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
- 31.** Which one of the following is must in Biotechnology?
- (1) Restriction endonuclease + DNA ligase
 - (2) Restriction exonuclease + DNA polymerase
 - (3) Alkaline phosphate + DNA Ligase
 - (4) RNA polymerase + DNA polymerase
- 32.** Taq. polymerase is obtained from :
- (1) *Bacillus thuriangiensis*
 - (2) *Thermus aquaticus*
 - (3) *Salmonella typhimurium*
 - (4) *Escherichia coli*
- 33.** To denature the DNA template in PCR it is heated to
- (1) 70°C
 - (2) 54°C
 - (3) 80°C
 - (4) 94°C
- 34.** 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
- 35.** Exonuclease removes nucleotides from
- (1) Specific positions
 - (2) the ends of the DNA
 - (3) any where in DNA
 - (4) All the above
- 36.** 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
- 37.** 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
- 38.** First recombinant DNA was made by Stanley Cohen and Herbert Boyer in :
- (1) 1968
 - (2) 1970
 - (3) 1972
 - (4) 1974
- 39.** The first restriction endonuclease discovered, was
- (1) Eco RI
 - (2) Sam I
 - (3) Bam HI
 - (4) Hind II
- 40.** In the vector pBR322 there is
- (1) One selectable marker
 - (2) Two selectable markers
 - (3) Three selectable markers
 - (4) None of the above
- 41.** When the isolation of genetic material is done the RNA can be removed by treatment with :
- (1) Protease
 - (2) Chitinase
 - (3) Ribonuclease
 - (4) Deoxyribonuclease
- 42.** 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.
- 43.** Knife of DNA :
- (1) DNA - ligase
 - (2) Restriction endonuclease
 - (3) Exonuclease
 - (4) Peptidase

44. Large vessel in which raw materials are biologically converted into specific products, individual enzymes etc using microbial plant, animal or human cell is:
- (1) Biotank
 - (2) Biovessel
 - (3) Bioreactor
 - (4) None of the above
45. Which one of the following is not required in PCR?
- (1) Oligonucleotide primer
 - (2) DNA template
 - (3) Taq polymerase
 - (4) Helicase enzyme
46. Select incorrect statement :
- (a) Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as *Lepidopterans*, *Coleopterans* and *Dipterans*
 - (b) RNA interference takes place in all eukaryotic organisms as a method of cellular defence
 - (c) Genetically modified crops are more sensitive to abiotic stresses
 - (d) Golden rice is protein enriched rice
 - (e) *Agrobacterium* is used to deliver desirable genes into animal cell
- (1) only a
 - (2) a, b and c
 - (3) a, c and d
 - (4) c, d and e
47. The enzymes, which remove nucleotides from the ends of the DNA are :
- (1) Exonuclease
 - (2) Endonuclease
 - (3) Cellulase
 - (4) Hydrolase
48. When a recombinant DNA is inserted within the coding sequence of an enzyme β -galactosidase, it results into inactivation of the enzyme gene this is called :
- (1) Insert inactivation
 - (2) Insertional inactivation
 - (3) Insertional activation
 - (4) None of the above
49. 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
50. Which type of ends are produced by EcoRI ?
- (1) Blunt ends
 - (2) Sticky ends
 - (3) Both (1) and (2)
 - (4) None of the above
51. 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
52. 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
53. Extraction, purification and packaging of products is collectively known as :
- (1) Upstream processing
 - (2) Distillation
 - (3) Downstream processing
 - (4) Genetic engineering
54. 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
55. Which of the following is best way to determine paternity ?
- (1) Gene counting
 - (2) Chromosome counting
 - (3) DNA finger printing
 - (4) Protein analysis
56. Ti plasmid is present in :
- (1) *E.coli*
 - (2) *Agrobacterium tumefaciens*
 - (3) *Agrobacterium orifaciens*
 - (4) *Vibrio cholerae*
57. 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

- 58.** DNA cannot pass through cell membrane as it is :
 (1) hydrophilic (2) hydrophobic
 (3) lipophilic (4) All the above
- 59.** 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
- 60.** The stickiness of the ends, facilitates the action of enzyme :
 (1) DNA ligase
 (2) DNA polymerase
 (3) Alkaline phosphatase
 (4) All of the above
- 61.** 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
- 62.** 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
- 63.** 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
- 64.** Which of the following method of vectorless gene transfer is suitable for plants ?
 (1) Biolistics method
 (2) Micro injection
 (3) Liposome mediated
 (4) Electroporation
- 65.** 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
- 66.** 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
- 67.** If any protein encoding gene is expressed in a heterologous host then protein is known as :
 (1) Recombinant gene
 (2) Recombinant protein
 (3) Selectable marker
 (4) Homogenous protein
- 68.** Which enzyme is used in PCR technique ?
 (1) Thermostable DNA polymerase
 (2) Thermostable RNA polymerase
 (3) Thermostable ligase
 (4) Thermostable vector
- 69.** If the plasmid in the bacteria does not have any insert then the colonies produce :
 (1) Blue colour in the presence of X-gal
 (2) No colour in the presence of X-gal
 (3) Blue colour in the absence of X-gal
 (4) None of the above
- 70.** Which of the following is used to deliver desirable gene into animal cell :
 (1) Disarmed retrovirus
 (2) Disarmed agrobacterium
 (3) Disarmed *E.coli*
 (4) Disarmed plant pathogen

71. *Agrobacterium tumefaciens*, 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

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 - (3) M-DNA
 - (4) T-DNA

72. The normal *E-coli* cell carries resistance gene against:

- (1) Ampicillin
- (2) Chloramphenicol
- (3) Tetracycline
- (4) None of the above

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 - (2) Chloramphenicol
 - (3) Tetracycline
 - (4) None of the above

ANSWERS KEY																				
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	1	3	4	1	3	1	3	1	1	3	4	3	2	1	4	3	2	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	3	1	3	3	2	4	3	1	3	1	2	4	1	2	2	1	3	4	2
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	3	1	2	3	4	4	1	2	1	2	4	1	3	3	3	2	1	1	2	1
Que.	61	62	63	64	65	66	67	68	69	70	71	72								
Ans.	3	1	1	1	2	2	2	1	1	1	4	4								

ANSWERS KEY																				
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	1	3	4	1	3	1	3	1	1	3	4	3	2	1	4	3	2	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	3	1	3	3	2	4	3	1	3	1	2	4	1	2	2	1	3	4	2
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	3	1	2	3	4	4	1	2	1	2	4	1	3	3	3	2	1	1	2	1
Que.	61	62	63	64	65	66	67	68	69	70	71	72								
Ans.	3	1	1	1	2	2	2	1	1	1	4	4								