

CHAPTER – 17: Biotechnology: Principles and Processes

1. What is the primary goal of biotechnology?
 - a) To improve agricultural productivity
 - b) To enhance human health
 - c) To develop new technologies for industry
 - d) All of the above
2. Which technique is used to amplify DNA segments?
 - a) Gel electrophoresis
 - b) Polymerase Chain Reaction (PCR)
 - c) Cloning
 - d) DNA sequencing
3. What is a plasmid?
 - a) A type of protein
 - b) A small, circular DNA molecule in bacteria
 - c) A virus
 - d) A type of enzyme
4. What is the function of restriction enzymes in biotechnology?
 - a) To synthesize proteins
 - b) To cut DNA at specific sequences
 - c) To amplify DNA
 - d) To insert DNA into plasmids
5. Which process is used to introduce foreign DNA into a host cell?
 - a) Electroporation
 - b) PCR
 - c) Gel electrophoresis
 - d) Southern blotting
6. What is recombinant DNA technology?
 - a) A method to replicate DNA
 - b) The process of combining DNA from different sources
 - c) The technique of sequencing DNA
 - d) A method to cut DNA at specific sites
7. Which method is used to separate DNA fragments based on size?

- a) PCR
 - b) Gel electrophoresis
 - c) Western blotting
 - d) Southern blotting
8. What is the role of a vector in genetic engineering?
- a) To cut DNA
 - b) To introduce foreign DNA into a host cell
 - c) To amplify DNA
 - d) To sequence DNA
9. Which technique is used for the synthesis of proteins in biotechnology?
- a) Gene therapy
 - b) Recombinant DNA technology
 - c) Protein electrophoresis
 - d) Gene cloning
10. What is the main application of CRISPR-Cas9 technology?
- a) DNA sequencing
 - b) Gene editing
 - c) Protein synthesis
 - d) DNA amplification
11. What is the purpose of gene cloning?
- a) To create multiple copies of a gene
 - b) To sequence entire genomes
 - c) To modify gene expression
 - d) To cut DNA into fragments
12. Which of the following is a common method for plant genetic modification?
- a) Gene gun
 - b) Electroporation
 - c) Liposome-mediated transfection
 - d) Southern blotting
13. What does the term “bioreactor” refer to in biotechnology?
- a) A device for DNA sequencing

- b) A vessel for growing cells or microorganisms
 - c) A type of enzyme
 - d) A method for gene cloning
14. Which of the following is an example of a biotechnology product used in medicine?
- a) Insulin
 - b) Ammonia
 - c) Ethanol
 - d) Plastics
15. What is the purpose of using a selectable marker in genetic engineering?
- a) To amplify DNA
 - b) To identify cells that have successfully integrated foreign DNA
 - c) To cut DNA at specific sites
 - d) To sequence DNA
16. Which method is used to transfer genes into animal cells?
- a) Gene gun
 - b) Microinjection
 - c) Electroporation
 - d) Both b and c
17. What is the function of a DNA probe in molecular biology?
- a) To amplify DNA
 - b) To detect specific DNA sequences
 - c) To cut DNA
 - d) To insert DNA into plasmids
18. What is the main goal of gene therapy?
- a) To sequence genes
 - b) To treat or prevent diseases by modifying genes
 - c) To clone genes
 - d) To cut DNA into fragments
19. Which of the following is a method for analyzing gene expression?
- a) PCR

- b) Northern blotting
 - c) Southern blotting
 - d) Western blotting
20. What is the role of an antibiotic resistance gene in a plasmid vector?
- a) To enhance DNA amplification
 - b) To select cells that have taken up the plasmid
 - c) To cut DNA at specific sites
 - d) To sequence DNA
21. Which of the following is an application of biotechnology in agriculture?
- a) Genetically modified crops
 - b) Recombinant proteins
 - c) Bioremediation
 - d) All of the above
22. What is the purpose of the polymerase chain reaction (PCR)?
- a) To cut DNA
 - b) To amplify specific DNA sequences
 - c) To sequence DNA
 - d) To insert genes into plasmids
23. Which enzyme is commonly used to join DNA fragments together?
- a) DNA polymerase
 - b) Restriction enzyme
 - c) Ligase
 - d) Reverse transcriptase
24. What is the main advantage of using genetically modified organisms (GMOs) in agriculture?
- a) Increased crop resistance to pests
 - b) Reduced nutritional content
 - c) Increased use of chemical fertilizers
 - d) Higher soil erosion
25. Which of the following is a technique used to study protein expression?
- a) Southern blotting

- b) Western blotting
 - c) Northern blotting
 - d) Southern blotting
26. What does the term “transgenic organism” refer to?
- a) An organism with altered genetic material from another species
 - b) An organism that has not undergone genetic modification
 - c) An organism that reproduces asexually
 - d) An organism with naturally occurring genetic variation
27. Which biotechnology technique involves the use of a “gene gun”?
- a) Gene cloning
 - b) Plant genetic modification
 - c) Protein purification
 - d) Gene sequencing
28. What is the purpose of a restriction digest?
- a) To cut DNA into fragments at specific sequences
 - b) To amplify DNA
 - c) To sequence DNA
 - d) To clone genes
29. What is the role of reverse transcriptase in biotechnology?
- a) To synthesize DNA from RNA
 - b) To amplify DNA
 - c) To cut DNA
 - d) To sequence DNA
30. Which of the following is used to determine the size of DNA fragments?
- a) PCR
 - b) Gel electrophoresis
 - c) Southern blotting
 - d) Northern blotting
31. What is the main function of a DNA library?
- a) To store and preserve DNA sequences from a particular organism
 - b) To sequence entire genomes

- c) To cut DNA into fragments
 - d) To amplify DNA
32. Which method is used to identify specific proteins in a sample?
- a) Western blotting
 - b) Northern blotting
 - c) Southern blotting
 - d) Gel electrophoresis
33. What does the term “genome editing” refer to?
- a) Sequencing the entire genome
 - b) Modifying specific genes within an organism’s genome
 - c) Cloning genes
 - d) Amplifying DNA sequences
34. Which of the following is a biotechnology method used to create insulin?
- a) Gene cloning
 - b) Recombinant DNA technology
 - c) Protein electrophoresis
 - d) PCR
35. What is the purpose of a control in a biotechnology experiment?
- a) To test the effects of the experimental variable
 - b) To ensure the accuracy of results
 - c) To provide a baseline for comparison
 - d) To amplify DNA
36. Which technology involves the use of microorganisms to clean up pollutants?
- a) Bioremediation
 - b) Gene therapy
 - c) Protein synthesis
 - d) Cloning
37. What is the main benefit of using DNA microarrays?
- a) To analyze multiple genes at once
 - b) To amplify DNA
 - c) To cut DNA into fragments

- d) To sequence entire genomes
38. Which technique is used to visualize DNA after gel electrophoresis?
- a) Autoradiography
 - b) PCR
 - c) Southern blotting
 - d) Western blotting
39. What is the function of a vector in gene therapy?
- a) To amplify genes
 - b) To deliver therapeutic genes into patient cells
 - c) To cut DNA
 - d) To sequence DNA
40. Which of the following techniques is used for RNA analysis?
- a) Northern blotting
 - b) Western blotting
 - c) Southern blotting
 - d) PCR
41. What is the purpose of using an expression vector?
- a) To clone genes
 - b) To produce proteins from cloned genes
 - c) To sequence DNA
 - d) To cut DNA
42. Which biotechnology technique involves the use of a “gene gun” for gene transfer?
- a) Plant genetic modification
 - b) Animal cell gene editing
 - c) Protein synthesis
 - d) DNA sequencing
43. What is the role of a reporter gene in biotechnology?
- a) To indicate whether a gene has been successfully inserted into a cell
 - b) To amplify DNA
 - c) To cut DNA
 - d) To sequence DNA

44. Which of the following is an example of a genetically modified crop?

- a) Bt cotton**
- b) Organic wheat**
- c) Traditional maize**
- d) Conventional rice**

45. What is the purpose of a DNA sequencer?

- a) To determine the nucleotide sequence of DNA**
- b) To cut DNA into fragments**
- c) To amplify DNA**
- d) To clone genes**

46. Which biotechnology application involves the creation of genetically modified organisms?

- a) Gene therapy
 - b) Genetic engineering
 - c) Protein purification
 - d) DNA sequencing
47. What is the function of a transformation experiment in biotechnology?
- a) To introduce new DNA into a cell
 - b) To cut DNA
 - c) To sequence DNA
 - d) To clone genes
48. Which enzyme is used to cut DNA at specific recognition sites?
- a) DNA polymerase
 - b) Ligase
 - c) Restriction enzyme
 - d) Reverse transcriptase
49. What is the main purpose of using a control plasmid in genetic experiments?
- a) To provide a baseline for comparison
 - b) To amplify DNA
 - c) To cut DNA
 - d) To produce proteins
50. Which technique is used for the analysis of gene expression profiles?
- a) DNA microarray
 - b) Western blotting
 - c) PCR
 - d) Southern blotting

Answer key

1	2	3	4	5
D	B	B	B	A
6	7	8	9	10
B	B	B	B	B
11	12	13	14	15

A	A	B	A	B
16	17	18	19	20
D	B	B	B	B
21	22	23	24	25
D	B	C	A	B
26	27	28	29	30
A	B	A	A	B
31	32	33	34	35
A	B	B	B	C
36	37	38	39	40
A	A	A	B	A
41	42	43	44	45
B	A	A	A	A
46	47	48	49	50
B	A	C	A	A