

**NEET : CHAPTER WISE TEST- 13****SUBJECT :- BIOLOGY****CLASS :- 12<sup>th</sup>****CHAPTER :- Biotechnology Principles & Process**

DATE.....

NAME.....

SECTION.....

**(SECTION-A)**

1. Which of the following is not a source of restriction endonuclease?  
(A) *Arthrobacter luteus*  
(B) *Escherichia coli*  
(C) *Entamoeba histolytica*  
(D) *Haemophilus influenzae*
2. Identify the wrong statement with respect to restriction enzymes.  
(A) More than 230 restriction enzymes have been isolated from 900 strains of bacteria.  
(B) DNA sequence recognised by restriction endonuclease is called palindromic nucleotide sequence  
(C) Hind II was isolated from *Haemophilus influenzae* Rd.  
(D) Restriction enzymes protect bacteria from bacteriophages.
3. Which of the following enzymes is used to remove the phosphate group from the 5' end of DNA molecule, leaving a free 5' hydroxyl group, so that it cannot be ligated to another DNA fragment?  
(A) DNA ligase  
(B) DNA polymerase  
(C) Alkaline phosphatase  
(D) Restriction endonuclease
4. The enzyme used to combine two fragments of DNA is  
(A) DNA ligase.  
(B) Molecular glue.  
(C) Alkaline phosphatase.  
(D) Both (A) and (B).
5. Re-joining of vector molecules after restriction enzyme digestion can be avoided by using  
(A) DNA ligase.  
(B) Endonuclease.  
(C) DNA polymerase.  
(D) Alkaline phosphatase.
6. The specific DNA sequence where EcoRI cuts is  
(A) GGATCC. (B) GAATTC.  
(C) GATTC. (D) GTTAAG.
7. Which of the following is correctly matched?  
(A) pBR322-Enzyme  
(B) Ligase Molecular glue  
(C) *Agrobacterium*-Production of insulin  
(D) EcoRI-Plasmid vector
8. Which of the following is not a vector-less method of gene transfer?  
(A) Electroporation (B) Microinjection  
(C) Biolistic method (D) *Agrobacterium*
9. Which of the following is correct with respect to the movement of DNA fragments on agarose gel during gel electrophoresis?  
(A) Negatively charged fragments do not move.  
(B) The larger the fragment size, the farther it moves.  
(C) Positively charged fragments move to the farther end.  
(D) The smaller the fragment size, the farther it moves.
10. The DNA fragments separated on agarose gel can be visualised after staining with  
(A) Aniline blue.  
(B) Ethidium bromide.  
(C) Bromophenol blue.  
(D) Acetocarmine.
11. In genetic engineering, the probe refers to  
(A) A radioactively labelled single-stranded DNA.  
(B) A radioactively labelled protein.  
(C) A radioactively labelled double-stranded DNA.  
(D) A radioactively labelled double-stranded RNA.
12. Which of the following is an incorrect statement?  
(A) DNA fragments are negatively charged.  
(B) A gene whose expression helps to identify transformed cells is known as selectable marker.  
(C) Exonuclease enzyme cuts the DNA within the specific positions.  
(D) Bacteria protect themselves from viruses by fragmenting viral DNA upon entry with endonucleases.
13. Which of the following is incorrect with respect to plasmids?  
(A) It is a circular DNA.  
(B) It carries antibiotic-resistance gene.  
(C) It has the ability of autonomous replication.  
(D) Its DNA is as long as chromosomal DNA

14. Which of the following is the most suitable method of introducing foreign DNA into a plant cell?  
 (A) Microinjection  
 (B) Biolistics  
 (C) Heat shock method  
 (D) Treatment with calcium chloride
15. In genetic engineering, recombinant DNA means  
 (A) DNA with piece of RNA.  
 (B) DNA which takes part in recombination.  
 (C) DNA with a piece of foreign DNA.  
 (D) DNA not associated with recombination.
16. During gene cloning, "gene taxi" is the term used for  
 (A) Plasmid. (B) Bacterium.  
 (C) Protozoa. (D) Vaccine.
17. "YAC" refers to  
 (A) Yeast artificial cell.  
 (B) Yeast artificial colony.  
 (C) Yeast artificial chromosome.  
 (D) Yeast anti-nuclear chromatin.
18. If the desired gene segment is inserted at the Sall site in pBR322, the resulting plasmid will confer resistance to  
 (A) Ampicillin. (B) Tetracycline.  
 (C) Streptomycin. (D) Amoxicillin.
19. Blunt or flush ends are produced by all of the following, except  
 (A) AluI. (B) SmaI.  
 (C) EcoRI. (D) HaeIII.
20. In 1963, two enzymes responsible for restricting the growth of bacteriophage in Escherichia coli were isolated. These enzymes were  
 (A) DNA polymerase and restriction endonuclease.  
 (B) Methylase and restriction endonuclease.  
 (C) Lyase and protease.  
 (D) Ligase and helicase.
21. Multiple cloning sites (MCS) in an ideal vector  
 (A) Are present only in shuttle vector.  
 (B) Contain multiple copies of cloned gene.  
 (C) Contain many copies of selectable marker genes.  
 (D) Allow flexibility in the choice of restriction enzymes for cloning.
22. Gene cloning means  
 (A) Producing new genotype.  
 (B) Producing genetically modified organisms.  
 (C) Obtaining identical copies of a particular DNA molecule and preserve the genotype.  
 (D) Replacing the mutated gene with normal genes.
23. Which of the following is a correct match?  
 (A) EcoRI--DNA polymerase  
 (B) Cos sites--M13 phage  
 (C) Yeast episomal plasmid--Shuttle vector  
 (D) Acridine orange--Matrix/gel used in gel electrophoresis
24. Which of the following is an incorrect statement regarding the enzymes used for recombinant DNA technology?  
 (A) DNA ligase helps in sealing gaps and acts as molecular glues.  
 (B) Reverse transcriptase is used to form cDNA from mRNA.  
 (C) DNA polymerase removes phosphate groups from the 5' end of double-stranded DNA and prevents unwanted ligation.  
 (D) Both (A) and (B).
25. The characteristics of molecular probe are  
 (i) Short nucleotide sequences,  
 (ii) Very long nucleotide sequence,  
 (iii) ssDNA only,  
 (iv) Complimentary to a part of desired gene,  
 (v) Double stranded,  
 (vi) ssDNA or ssRNA.  
 The correct option is  
 (A) (i), (ii), and (vi). (B) (i), (iv), and (vi).  
 (C) (ii), (iii), and (v). (D) (ii), (iii), and (vi).
26. When a dicot plant is infected by Agrobacterium tumefaciens, the T-DNA in Ti plasmid induces the plant to produce  
 (A) Growth inhibitors such as abscisic acid,  
 (B) Growth hormones such as auxins and cytokinins,  
 (C) Multiple copies of plasmids.  
 (D) Restriction endonucleases,
27. The mechanism of intake of DNA fragments from the surrounding medium by a cell is called  
 (A) Transformation. (B) Transduction.  
 (C) Both (A) and (B). (D) Conjugation.

28. \_\_\_\_\_ is a composite structure made up of bacteriophage and plasmid.  
 (A) M13 phage (B) Cosmid  
 (C) YAC (D) Phagemid

29. Match the options given in Column I with those given in Column II.

**Column I**

- A. Taq polymerase
- B. Alkaline phosphatase
- C. Exonuclease
- D. Terminal deoxynucleotidyl transferase

**Column II**

- (i) Removes phosphate from the 5' end
  - (ii) Removes nucleotides from the ends of DNA strands
  - (iii) Adds poly A and poly T, to make blunt ends sticky
  - (iv) Thermostable DNA polymerase
- (A) t - (iv) B - (i) C - (ii) D - (iii)  
 (B) A - (i) B - (ii), C - (iii), D - (iv)  
 (C) A - (iv), B - (ii) C - (i) D - (iii)  
 (D) A - (i) B - (iii), C - (ii) D - (iv)

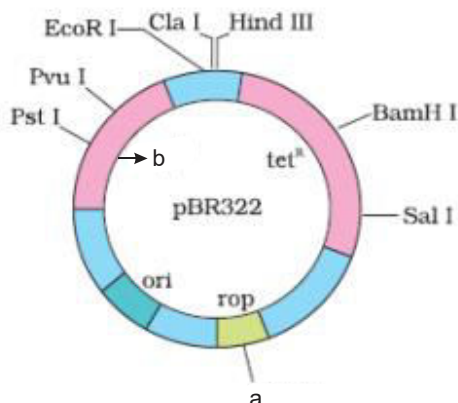
30. Which of the following can distinguish transformants from non-transformants?

- (A) Presence of more than one recognition site in the vector DNA.
- (B) Presence of alien DNA into the vector DNA results into insertional inactivation of selectable marker.
- (C) Antibiotic-resistance gene gets inactivated due to insertion of alien DNA.
- (D) Both (B) and (C).

31. Blue-white selection is used to

- (A) Express the product of foreign gene.
- (B) Regulate metabolism of host cell.
- (C) Test the presence of foreign gene in the plasmid of transformed bacteria.
- (D) Initiate replication of plasmid.

32. Consider the diagram of the plasmid vector pBR322 and identify "a" and "b".



- (A) a-PvuI, b-amp<sup>R</sup> (B) a-AluI, b-Ori
- (C) a-HindI, b-amp<sup>R</sup> (D) a-EcoRII, b-tet<sup>R</sup>

33. "The integration of natural science and organism cells, parts thereof, and molecular analogues for products and services." This definition of biotechnology was given by

- (A) Genetic Engineering Approval Committee (GEAC).
- (B) Central Drug Research Institute (CDRI).
- (C) European Federation of Biotechnology (EFB).
- (D) International Union of Biotechnology (IUB).

34. The application of PCR technique is

- (A) To harvest stem cells.
- (B) To replicate specific DNA sequence.
- (C) To replicate RNA sequence.
- (D) To obtain recombinant protein for commercial use.

35. Isolation of DNA from bacterial cells involves the use of

- (A) Chitinase. (B) Agarose.
- (C) Cellulase. (D) Lysozyme.

**(SECTION-B)**

36. The PCR technique is used for

- (A) In vivo replication of specific DNA sequence using thermostable DNA polymerase.
- (B) In vivo RNA synthesis.
- (C) In vitro synthesis of specific DNA sequence using thermostable DNA polymerase.
- (D) In vitro synthesis of proteins.

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

- (A) Precipitate DNA.
- (B) Break open the cell to release DNA.
- (C) Remove proteins such as histone.
- (D) Facilitate action of restriction enzymes.

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

- (A) Fungi--Chitinase
- (B) Bacteria---Lysozyme
- (C) Plant cells---Cellulase
- (D) Algae---Methylase

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

- (A) Downstream processing.
- (B) Upstream processing.
- (C) Bioprocessing.
- (D) Posttranscriptional modification.

40. Elution means  
 (A) Isolating DNA from the chosen organisms.  
 (B) Transfer of DNA on nitrocellulose membrane.  
 (C) Binding of probe with specific sequences.  
 (D) Cutting and extraction of DNA bands from the agarose gel.

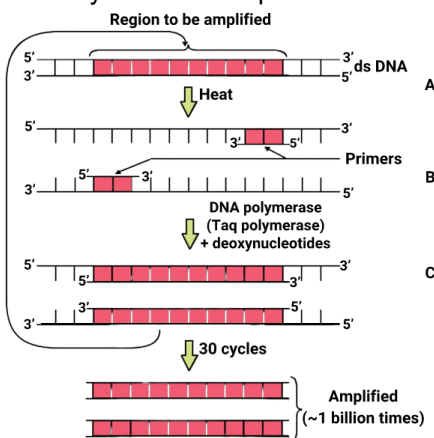
41. If a protein-encoding gene is expressed in a heterologous host, it is called a  
 (A) Simple protein.  
 (B) Recombinant protein.  
 (C) Conjugated protein.  
 (D) Denatured protein.

42. Which of the following is not a component of downstream processing?  
 (A) Separation (B) Purification  
 (C) Preservation (D) Expression

43. The blotting technique used for separation of proteins is called  
 (A) Northern blotting.  
 (B) Western blotting.  
 (C) Southern blotting.  
 (D) Eastern blotting.

44. Which of the following is the application of PCR?  
 (A) Diagnosis of mutations in the genetic diseases  
 (B) Detection of pathogens  
 (C) Used to clone DNA fragments of extinct animals  
 (D) All of these

45. The diagram given below refers to PCR. Identify the correct option:



- (A) 1-Denaturation, 2-Annealing, 3-Extension, 4- Amplification  
 (B) 1-Annealing, 2-Denaturation, 3-Extension, 4- Amplification  
 (C) 1-Extension, 2-Denaturation, 3-Annealing, 4- Amplification  
 (D) 1-Denaturation, 2-Extension, 3-Annealing, 4- Amplification

46. Thermal cycler is used in  
 (A) Chemical reactions.  
 (B) Radioactivity reactions.  
 (C) Enzyme-catalysed reactions.  
 (D) Polymerase chain reactions.

47. Which of the following is a correct sequence of processes in recombinant DNA technology?  
 I. Transfer of the recombinant DNA into the host.  
 II. Isolation of DNA with desirable genes.  
 III. Introduction of identified DNA into the vector.  
 IV. Downstream processing.  
 V. Culturing the host cells at large scale in bioreactor.  
 (A) I → II → III → IV → V  
 (B) II → III → IV → V  
 (C) III → I → II → IV → V  
 (D) I → III → II → V → IV

48. Match the tissues/molecules mentioned in Column I with those of the degrading enzymes mentioned in Column II and select the correct option.

**Column I**

- A. Cell wall  
 B. RNA  
 C. Histone  
 D. Pectin

**Column II**

- (i) Pectinase  
 (ii) Protease  
 (iii) Cellulase  
 (iv) Ribonuclease  
 (A) A-(ii), B-(i), C-(iii), D - (iv)  
 (B) A-(i), B - (ii) C - (iv) , D-(iii)  
 (C) A-(iii), B-(iv), C-(i), D - (ii)  
 (D) A-(iii), B - (iv) , C - (ii) , D - (i)

49. Read the following statements and select the incorrect ones.

- (i) Downstream processing is one of the steps of polymerase chain reaction.  
 (ii) Disarmed pathogen vectors are used to deliver desirable genes into host cells.  
 (iii) Taq polymerase remains active during the high-temperature treatment during the denaturation of DNA.  
 (iv) Pfu polymerase isolated from *Pyrococcus furiosus* is a thermostable bacterium used in PCR technique.  
 (v) In gel electrophoresis, the DNA fragments are separated based on their charge only.  
 (A) (i) and (ii) (B) (ii) and (iii)  
 (C) (i), (iv), and (v) (D) (i) and (v)

50. \_\_\_\_\_ helps in adding air that bubbles through the culture medium in a bioreactor.

- (A) Stirrer (B) Sparger  
 (C) Impeller (D) Foam breaker