Q.1. Select from the following which are used as tools of recombinant DNA technology

A. Restriction endonucleases cut DNA at specific recognition sites.

B. Ligases help in joining DNA fragments.

C. Cloning vectors to ferry gene of interest in host organism

D. Host organism for cloning of gene of interest and for expression of foreign gene

E. RNA polymerase is used to cut plasmids.

(1) A, B, C, D are true only

(2) A and E are true only

(3) C, D and E are true only

(4) A, C, D, E are true only

Q.2. Choose correct statement from the following wrt restriction enzymes

A. They recognize palindromic sequences.

B. EcoRI produces sticky ends.

C. Hind II was the first restriction endonuclease discovered.

D. Restriction enzymes are isolated from viruses.

E. They cut both strands of DNA at specific sites.

(1) C and E only

(2) A, B, C and E only

(3) B, D and E only

(4) D and E only

Q.3. Choose correct statement from the following wrt cloning vectors

A. Plasmids are commonly used as cloning vectors.

B. Vectors must have an origin of replication.

C. They need selectable markers like antibiotic resistance genes.

D. Vectors require restriction sites for insertion of foreign DNA.

E. Ti plasmid is used to deliver gene of our interest in a variety of animals

(1) C and E only

(2) A, B, C and E only

(3) A, B, C and D only

(4) D and E only

Q.4. Choose correct statement from the following regarding plasmids

A. Plasmids are circular, double-stranded DNA molecules.

B. pBR322 is one of the first engineered plasmids.

C. They replicate independently of the host genome.

D. Plasmids are essential for bacterial survival.

E. Plasmids may carry antibiotic resistance genes.

(1) A, B and D are true only

(2) A, B, D, E are true only

(3) B, C, D, E are true only

(4) A, B, C, E are true only

Q.5. Choose correct statement from the following regarding competentence of cell

A. Competence means ability of bacterial cell to take up DNA.

B. Competence can be induced by treatment with $CaCl_2$.

C. Heat shock method allows DNA entry into bacterial cells.

D. Electroporation is a method to increase permeability using electric pulses.

E. Competence is a natural property of all bacteria.

(1) A, B, C, D are true only

(2) A, B, D, E are true only

(3) B, C and E are true only

(4) A, B, C, E are true only

Q.6. Choose correct statement from the following regarding electrophoresis

A. Agarose gel electrophoresis is used for separation of DNA fragments.

B. DNA can seen as orange color band when stained with ethidium bromide gel exposed to UV light

C. Smaller fragments move faster than larger ones.

D. DNA always moves towards cathode.

E. DNA is negatively charged due to phosphate backbone.

(1) A, B, C, D are true only

(2) A, B and E are true only

(3) C, D and E are true only

(4) A, B, C, E are true only

Q.7. Choose correct statements regarding Polymerase Chain Reaction (PCR)

A. PCR amplifies DNA in vitro.

B. Taq polymerase is thermolabile enzyme from *Thermus aquaticus*.

C. PCR requires primers, template, nucleotides, and polymerase.

D. PCR cycles involve denaturation, annealing, and extension.

E. PCR is used only for cloning vectors, not diagnosis.

(1) C and E only

(2) A, D and E only

(3) B, D and E only

(4) D and E only

Q.8. Choose correct statements regarding bioreactors

A. Bioreactors provide optimum conditions for growth of organisms.

B. Stirred tank bioreactors ensure even mixing and aeration.

C. Sparged bioreactors introduce sterile air into medium.

D. Bioreactors are used only for microbial cultures.

E. They can be used to produce pharmaceuticals like insulin.

(1) A and D are true only

(2) A, B, D, E are true only

(3) B, C, D, E are true only

(4) A, B, C, E are true only

Q.9. Choose correct statements regarding downstream processing

A. It refers to recovery and purification of biosynthetic products.

B. Involves separation, purification, and formulation steps.

C. Downstream processing is the final step before marketing.

D. It is only required in pharmaceutical industry.

E. Purification ensures product safety and quality.

(1) A, B, C, E are true only

(2) A, B, D, E are true only

(3) B, C, D, E are true only

(4) A, B, C, D are true only

Q.10. Which of following are the process of recombinant DNA technology. Choose correct option.

A. Isolation of genetic material → Cutting DNA → Amplification → Insertion into host → Downstream processing.

B. Restriction enzymes are used in cutting step.

C. PCR is used in amplification step.

D. Bioreactors are used in large-scale production.

E. Downstream processing is optional.

(1) A, B, C, E are true only

(2) A, B and D are true only

(3) B, C, D, E are true only

(4) A, B, C, D are true only

Q.11. Choose incorrect statement from the following

A. Two enzymes responsible for restricting the growth of bacteriophage in E. coli were isolated in year 1963

B. Recognition sequence of Hind II is made up of six base pairs

C. In EcoRI 'co' comes from two letters of name of genus

D. The recognition sequence of EcoRI is made up of five base pairs

E. Each restriction endonucleases recognise a specific palindromic peptide sequence in the DNA

(1) C and E only

(2) A, D and E only

(3) C, D and E only

(4) D and E only

Q.12. Following are the method to introduce alien DNA into host cell. Choose correct option

A. Microinjection

B. Biolistics

C. Disarmed pathogen vectors

D. Electroporation

E. Lipofection

(1) All are true except A

(2) All are true except B
(3) All are true except C
(4) All are true

Q.13. Choose correct statement regarding blue-white screening

A. Plasmid has LacZ gene encoding β-galactosidase.
B. Insertion of foreign DNA in LacZ disrupts the gene.
C. Recombinants form blue colonies on X-gal medium.
D. Non-recombinants form blue colonies.
E. White colonies are recombinants.

(1) A, B, C, E are true only
(2) A, B, D, E are true only
(3) B, C, D, E are true only
(4) A, B, C, D are true only

Q.14. Choose correct statements regarding palindromes & sticky ends

A. Palindromic sequences read same 5' → 3' on both strands.
B. EcoRI recognizes GAATTC.
C. Cutting with EcoRI produces blunt ends.
D. Sticky ends allow base-pairing with complementary sequences.
E. Ligase seals sticky ends permanently.

(1) A, B, C, E are true only
(2) A, B, D, E are true only
(3) B, C and D are true only
(4) A, B, C, D are true only

Q.15. Choose incorrect statements wrt Biolistics or gene gun method

A. It uses microparticle of gold or tungsten
B. It is suitable for plant cell
C. It is suitable for bacterial cell
D. It is a physical metod of gene transfer
E. More efficient than biological methods

(1) C and E only
(2) A, D and E only
(3) C, D and E only
(4) D and E only

Q.16. Read the following statements and choose the correct option:

A. Asexual reproduction helps in preservation of genetic information, while sexual reproduction permits variation.
B. Sexual reproduction creates opportunities for genetic recombination, which may be beneficial to organisms and populations.
C. Traditional hybridisation often transfers desirable gene only
D. Genetic engineering allows transfer of only specific desirable genes without unwanted genes.

(1) A, B and C are correct only
(2) A, B and D are correct only
(3) B and D only are correct only
(4) A, B, C, and D are correct

Q.17. Choose correct statements wrt Ti Plasmid

A. Ti plasmid comes from *Agrobacterium tumefaciens*.
B. It is used for transferring foreign genes into dicot plants.
C. Tumor-inducing genes are retained in recombinant plasmid.
D. Modified Ti plasmid acts as a cloning vector.
E. It is widely used in creating transgenic plants.

(1) A, B, C, E are true only
(2) A, B, D, E are true only
(3) C, D and E are true only
(4) A and D are true only

Q.18. Choose correct statements wrt Bioreactor Design

A. Bioreactors have an agitator system for mixing.
B. Aeration system provides oxygen supply.
C. Foam control and pH control are essential.
D. They are designed to maximize yield of products.
E. They function without sterile conditions.

(1) A, B and E are true only
(2) A, B, D, E are true only
(3) B, D and E are true only
(4) A, B, C, D are true only

Q.19. Read the following statements carefully and choose the correct option:

A. Stanley Cohen and Herbert Boyer constructed the first recombinant DNA molecule in 1972.

B. Restriction enzymes, known as molecular glue, enabled cutting of DNA at specific sites.

C. DNA ligase was used to join the antibiotic resistance gene with the plasmid vector.

D. Plasmids act as vectors to transfer alien DNA into host organisms, similar to how a mosquito transfers malarial parasite.

E. The ability of recombinant DNA to replicate and produce many copies inside *E. coli* is called cloning of the gene.

(1) A and C are correct only

(2) A, B, C, and E are correct only

(3) All statements are correct

(4) A, C, D and E are correct only

Q.20. Read the following statements and choose the correct option:

A. In the majority of organisms, the genetic material is ribonucleic acid (RNA).

B. To cut DNA with restriction enzymes, it must be in pure form, free of RNA, proteins, polysaccharides, and lipids.

C. Lysozyme (for bacteria), cellulase (for plant cells), and chitinase (for fungi) are enzymes used to break cell walls and release DNA.

D. RNA is removed by treatment with protease, while proteins are removed by ribonuclease.

E. Pure DNA can be precipitated as fine threads by adding chilled ethanol.

(1) A, B, and C only are correct

(2) B, C, and E are correct

(3) A, C, and D are correct

(4) B, D, and E only are correct

ANWERS - KEY

Q	1	2	3	4	5	6	7	8	9	10
Ans.	(1)	(2)	(3)	(4)	(1)	(4)	(2)	(4)	(1)	(4)
Q	11	12	13	14	15	16	17	18	19	20
Ans.	(3)	(4)	(2)	(2)	(1)	(2)	(2)	(4)	(4)	(2)