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F - 822

M.Sc. (THIRD SEMESTER)
EXAMINATION, Dec. - Jan., 2021-22
(PAPER NINTH)
BIOTECHNOLOGY
(GENETIC ENGINEERING)

Time : Three Hours] ***[Maximum Marks : 80***
[Minimum Pass Marks : 16

Note : Attempt all sections as directed.

Section - A
(Objective /Multiple Choice Questions)
(1 Mark each)

Note : Attempt all questions:

Choose the correct answer:

1. Choose the correct statement with respect to the bacterial genome.
   (A) They are difficult to sequence
   (B) They are easy to sequence
   (C) Method such as transcription and translation are satisfactory
   (D) Only transcription can be carried out

2. The DNA fragments have sticky ends due to -
   (A) Endonuclear
   (B) Unpaired bases
   (C) Calcium ions
   (D) Free methylation
3. Genome wise gene expression analysis is performed using.
   (A) DNA microarrays
   (B) Northern analysis
   (C) Real time PCR
   (D) RT - PCR
4. Which of the following is the best method to determine bacteriophage concentration in a sample?
   (A) Spectrophotometry
   (B) Phaque assay
   (C) Copy assay number
   (D) Light microscopy
5. Which of the following ions are required for the activity of type II restriction enzymes?
   (A) Ca^{2+}
   (B) Mg^{2+}
   (C) Cl^{2+}
   (D) Mn^{2+}

6. Which of the following statements are true regarding restriction enzyme?
   (A) Type I and Type II enzyme cuts far away from the restriction sites.
   (B) Type II cuts DNA with in restriction sites
   (C) ECOR I is a type II restriction enzyme
   (D) All of these
7. Why human cells are more perferred for the production of the recombinant protein?
   (A) Say in culturing
   (B) More sterility
   (C) Can be easily harvested
   (D) Post - translational modification
8. Introduction of healthy gene at specific sites to displace the defective gene is referred as.
   (A) Germ line therapy
   (B) Somatic cell therapy
   (C) Both (A) and (B)
   (D) Corrective gene therapy
9. The method of treating genetic diseases by introducing a remadial gene that prevents the expression of a specific defective gene is -
   (A) ex - vivo therapy
   (B) in-vivo therapy
   (C) antisense therapy
   (D) all of these

P.T.O.

10. Which of the following functions is not performed by transposase?
    (A) Restriction of the IS element
    (B) Integration of the transposon
    (C) Formation of the RNA intermediate
    (D) Restriction of the host genome
11. Which of the following protein are involved in initiating phage assembly and maintaining the stability of the viral particle?
    (A) gp III and gp VIII
    (B) gp VIII and gp II
    (C) gp VI and gp IV
    (D) gp VII and gp IX
12. Which of these is not a feature associated with M13 phage?
    (A) Doesn't need genes for insertion into host genome
    (B) Capsid constructed of multiple copies of 3 genes
    (C) Simpler infection cycle than lambda
    (D) Capsid constructed of 15 different protein

13. Choose the correct statement for the synthesis of RNA probe.

(A) Double stranded DNA is only used for probe synthesis

(B) Single stranded DNA can be used for probe synthesis

(C) Probes are prepared for RNA transcripts which are specific for only particular strand

(D) Probes are prepared for RNA transcripts which are specific for both the strands

14. A times partial sequencing of cloned CDNAs is carried out. There CDNA are known as.

(A) Expressed RNA sequences

(B) Expressed sequence tags (ESTS)

(C) Expressed CDNA sequences

(D) Library

15. Choose the incorrect statement for oligo-dT cellulose.

(A) It is used for separation of polyadenylated MRNA from another MRNA

(B) Oligo-dt are covalently attached to the solid support via - OH bonds.

(C) A solution containing RNA is passed through the column.

(D) Poly A tail attaches to the oligo-dT by ionic bonds.

16. Which of the following step is performed before site - directed mutagensis?

(A) Expression

(B) Protein assay

(C) Preparative biochemisty

(D) Knowledge based design of novel protein

17. Which of the following is not true for protein engineering?

(A) Protein assay is a step in protein engineering

(B) It requires a knowledge based design

(C) Preparative biochemistry is performed before protein assay.

(D) It does not require gene cloning

18. Which of the following components bind to the soild column made of sillica under high salt concentration.

(A) Protein

(B) Polysaccharides

(C) Both protein and polysaccharides

(D) Plasmid DNA

19. Restriction endonuclears is having a defence mechanism in the bacterial system against foreign DNA such as viruses. But how it is able to protect its own DNA.

(A) By methylation of bacterial DNA by restriction enzyme

(B) By methylation of foreign DNA by restriction enzyme

(C) By Phosphorylation of bacterial DNA by restriction enzyme

(D) By phosphorylation of foreign DNAby restriction enzyme

20. Which of the following is true about T-DNA?

(A) Integration of T-DNA can occur at many different, apparently random, sites in the plant nuclear DNA.

(B) Integration of T-DNA occurs only at one specific site in the plant nuclear DNA

(C) Integration of T-DNA occurs at two specific sites in the plant nuclear DNA

(D) Integration of T-DNA occurs at one site that may be random in the plant nuclear DNA

P.T.O.

Section - B

(Very Short Answer Type Question)

(2 Marks each)

Note- Attempt all questions.

Explain the following terms in 2 or 3 lines only.

1. Phage display
2. Linker
3. Reverse transcriptase
4. DNA microarray
5. Gene library
6. Radio active labelling of probes
7. Insertion and replacement vector
8. RAPD

Section - C

(Short Answer Type Questions)

(3 Marks each)

Note- Attempt all questions. Write your answer of the following question within 75 words.

1. Describe the role of T-DNA in gene tagging.
2. Explain the codon optimization method.
3. Explain SI mapping?
4. Name three elements incorporated into a plasmid vector for efficient cloning.
5. Explain two hybrid system.
6. Describe site directed mutagenesis.
7. Explain the working of binary vector of Ti plasmid.
8. Discuss the gene silencing by antisense technique.

Section - D

(5 Marks each)

(Long Answer Type Question)

Note - Attempt all questions. Write your answer of the following questions within 75 words.

1. Define in - vivo and ex- vivo gene therapy with a suitable example, explain how viral and non-viral gene delivery systems used in gene therapy.

OR

Explain the techniques for the refolding of recombinant proteins.

2. Expression of hetrologoue genes in bacteria and mammalian cells.

OR

Give an account of nuclic acid hybridization techniques used in genetic engineering.

3. Describe the techniques of restriction mapping in DNA and map construction

OR

Explain the construction and screening of CDNA library.

4. Give the principle and describe the phases of typical polymerase reaction. And application of PCR in modern molecular biology.

OR

Discuss in detail, various types of cloning vector.