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SARDAR PATEL UNIVERSITY
M.Sc. (III SEMESTER) EXAMINATIONS
2nd January, 2021 (Saturday) Time: 02.00 – 04.00 p.m.

PAPER: PS03CBIC22 - GENETIC ENGINEERING

Total Marks: 70
(8 x 1 = 8 marks)

Choose the most appropriate answer:

- EDTA is used in DNA isolation for _____
 - Inhibiting DNA degradation by DNase
 - Removing Mg²⁺ required for bacterial cell wall structure maintenance
 - Removing outer LPS layer of Gram negative bacteria
 - All of these.
- Which of the following ions is required for activity of type 2 restriction enzymes?
 - Ca²⁺
 - Mg²⁺
 - Na²⁺
 - Mn²⁺.
- Which of the following libraries would be expected to be the same?
 - Genomic libraries from mouse liver cells and kidney cells
 - cDNA libraries from mouse liver cells and kidney cells
 - Genomic libraries from human liver cells and mouse liver cells
 - cDNA libraries from human liver cells and mouse liver cells.
- Site directed mutagenesis on DNA is possible through
 - Physical mutagens
 - Chemical mutagens
 - Random cleavage and ligation
 - None of these
- Eukaryotic genes may not function properly when cloned into bacteria because bacteria
 - Cannot excise introns
 - Destroy the eukaryotic DNA by native endonucleases
 - Eukaryotic promoters are not recognized by bacterial RNA polymerase
 - all of the above
- A mouse in which one particular gene has been replaced by its inactivated form generated *in vitro* is called
 - transgenic mouse
 - knockout mouse
 - abnormal mouse
 - mutant mouse
- Stringency in Southern blotting is essential to
 - allow the DNA to get cross linked to the membrane
 - denature the dsDNA
 - allow specific binding of the probe to the target DNA
 - avoid specific interaction between probe and target DNA
- In conventional PCR, quantification of the initial DNA used is NOT possible since
 - Ethidium Bromide does not bind quantitatively to DNA
 - the reaction is not optimized in the first few cycles
 - the amplification of DNA is not exponential

[1]

[P.T.O.]

II. Fill in the blanks / Write True or False:

(16 x 1 = 16 marks)

Fill in the blanks:

1. The EMBL vectors are derived from _____ DNA.
2. IPTG and X-Gal are used in the _____ screening technique
3. Adding monomeric nucleotides at DNA ends to improve ligation is known as _____.
4. The part of the Ti plasmid that integrates into the host plant chromosome is known as _____.
5. Sanger's DNA sequencing technique uses _____ nucleotides for chain termination.
6. In pyrosequencing _____ is used as reporter system for base incorporation

Write true or False

7. Recognition sites for restriction enzymes have higher GC content.
8. A variant of human tissue type plasminogen activator proteins in transgenic Goat is usually expressed in milk
9. Bt genes or Cry genes to make BT Cotton are obtained from Boll worm
10. Luciferase reporter system is a sensitive, stand alone system.
11. Maxam-Gilbert's method of DNA sequencing could not be automated since toxic chemicals are used.
12. RAPD is an expensive as well as difficult method of DNA finger printing
13. Novel plant varieties could be protected under patents law
14. BAC vectors have less insert capacity but greater stability than YAC vectors
15. SYBR Green binds to DNA in a sequence specific manner.
16. Tungsten microprojectiles used for Biolistics have better DNA holding capacity and no toxicity

III. Answer briefly any seven:

(7 x 2 = 14 marks)

1. Differentiate between Isoschizomers and Neoschizomers.
2. What is star activity of restriction enzymes?
3. Enlist the properties of an ideal plasmid vector.
4. Differentiate between Cloning vector and Expression vector.
5. Use of alkaline phosphatase in rDNA technology

6. Differentiate between *E. coli* and T4 DNA ligase
7. Taqman probes
8. Principle of VNTRs
9. Golden rice

IV. Answer in detail

(4 x 8 = 32 marks)

1. Explain in detail the principle, procedure and the precautions to be taken for isolation of genomic DNA from *E. coli*.

OR

1. Explain mechanism of ligation of DNA. Write a note on linkers and homopolymer tailing.
2. Write a note on: a) colony hybridization b) Subtractive hybridization.

OR

2. What are the salient features of expression vectors? Discuss the method for recombinant protein production using expression vectors
3. Explain the basic principle of Sanger's dideoxy sequencing. What are the applications of DNA sequencing.

OR

3. Describe the principle and advantages of VNTR DNA fingerprinting. With suitable examples outline its applications in forensics.
4. Explain the strategy used for the production of any one transgenic plant in detail

OR

4. Give an account of the rules and regulations for the release and use of GMOs in India

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