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SARDAR PATEL UNIVERSITY M.Sc. (III SÉMESTER) EXAMINATIONS

2nd January, 2021 (Saturday)

Time: 02.00 - 04.00 p.m.

PAPER: PS03CBIC22 - GENETIC ENGINEERING

Total Marks: 70 $(8 \times 1 = 8 \text{ marks})$

Choose the most	appropriate answer.	
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- 1. EDTA is used in DNA isolation for
 - a) Inhibiting DNA degradation by DNase
 - b) Removing Mg+2 required for bacterial cell wall structure maintenance
 - c) Removing outer LPS layer of Gram negative bacteria
 - d) All of these.
- 2. Which of the following ions is required for activity of type 2 restriction enzymes?
 - a) Ca+2
- b) Mg+2

- c) Na+2
- d) Mn+2.
- 3. Which of the following libraries would be expected to be the same?
 - a) Genomic libraries from mouse liver cells and kidney cells
 - b) cDNA libraries from mouse liver cells and kidney cells
 - c) Genomic libraries from human liver cells and mouse liver cells
 - d) cDNA libraries from human liver cells and mouse liver cells.
- 4. Site directed mutagenesis on DNA is possible through
 - a) Physical mutagens

- b) Chemical mutagens
- c) Random cleavage and ligation
- d) None of these
- 5. Eukaryotic genes may not function properly when cloned into bacteria because bacteria
 - a. Cannot excise introns
 - b. Destroy the eukaryotic DNA by native endonucleases
 - c. Eukaryotic promoters are not recognized by bacterial RNA polymerase
 - d. all of the above
- 6. A mouse in which one particular gene has been replaced by its inactivated form generated in vitro is called
 - a) transgenic mouse mouse
- b) knockout mouse
- abnormal mouse c)
- d) mutant

- 7. Stringency in Southern blotting is essential to
 - a. allow the DNA to get cross linked to the membrane
 - b. denature the dsDNA
 - c. allow specific binding of the probe to the target DNA
 - d. avoid specific interaction between probe and target DNA
- 8. In conventional PCR, quantification of the initial DNA used is NOT possible since
 - a. Ethidium Bromide does not bind quantitatively to DNA
 - b. the reaction is not optimized in the first few cycles
 - c. the amplification of DNA is not exponential

 $(16 \times 1 = 16 \text{ marks})$

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

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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 termination.	uses nucleotides for chain			
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:

 $(7 \times 2 = 14 \text{ marks})$

- 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

 $(4 \times 8 = 32 \text{ marks})$

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

OR

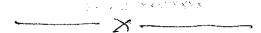
- 1. Explain mechanism of ligation of DNA. Write a note on linkers and homopolymer tailing.
- 2. Write a note on: a) colony hybridization b) Subtractive hybridization.

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



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