

SARDAR PATEL UNIVERSITY
M. Sc. Integrated Biotechnology, Sixth Semester Examination
Day and Date: Wednesday, 20-03-2019
Time: 2:00 pm to 5:00 pm
Paper Code and Subject: PS06CIGB02, Genetic Engineering

Total Marks: 70

Q-1 Multiple choice questions (All are compulsory).

[8x1=8]

- (i) Which of the following bacterium is considered as "Natural genetic engineer"?
- a) *Agrobacterium tumefaciens* b) *Agrobacterium radiobacter*
 c) *Thermos aquaticus* d) *Pseudomonas putida*
- (ii) _____ enzyme is used to avoid ligation of separate DNA fragments.
- a) Phosphatase b) Kinase c) Ligase d) Endonuclease
- (iii) Dry milk in the process of hybridization is added
- a) Reduce Nonspecific binding b) used for detection
 c) for expression d) None
- (iv) *E. coli* is generally used for gene cloning because
- a) it supports the replication of recombinant DNA b) it is easy to transform
 c) it is free from elements that interferes with replication and recombination of DNA
 d) all of these
- (v) Some of the steps involved in Gene Cloning are given below.
- i) Insertion of isolated gene to the vector ii) Introduction of recombinant vector to the host
 iii) Isolation of desired gene iv) Expression of recombinant gene in host
 v) Extraction of recombinant gene product
- The correct sequence of steps involved are
- a) iii, i, iv, ii, v b) iii, i, ii, iv, v c) i, ii, iii, iv, v d) ii, i, iii, iv, v
- (vi) Which of the organisms possess ssDNA
- a) *E. Coli* b) *S. Cerevisiae* c) Phage- λ d) Phase-M13
- (vii) What is the characteristic of lacZ gene of pUC18 vector among the following?
- a) Encodes for antibiotic resistance b) Encodes for β -galactosidase enzyme
 c) Encodes for β -lactamase enzyme d) Encodes for β -galactoside transferase enzyme.
- (viii) The technique used to locate specific genes in chromosomes is
- a) Colony hybridization b) In situ hybridization
 c) Western blotting d) Plaque hybridization

Q-2 Answer the following questions in short. (Any Seven)

[7x2=14]

- (i) Enlist properties of ideal vector.
- (ii) Write the principle of chemical based gene transfer method.
- (iii) Write a note and Clarke and carbon formula for expected recombinants.
- (iv) Write the importance of *Sau3A1* and *BamH1* restriction endonuclease.
- (v) Write the mechanism of nick translation.
- (vi) Expand BCIP, NBT, DEPC and DIG.
- (vii) Define cosmid?
- (viii) Give a brief account on T7 promoters.
- (ix) How reproductive isolation, a method of biological confinement is used?

(P.T.O)

- Q-3 (A) Explain the various steps involved in the construction of recombinant DNA. [06]
(B) Give an account on phagemid. [06]

OR

- (B) Discuss the cloning strategy for pBR322 vector. [06]
Q-4 (A) Write an explanatory notes of Alkaline phosphatase, Polynucleotide kinase and Terminal transferase giving its importance in the field of genetic engineering. [06]
(B) Explain two suitable procedure for screening of Gene of interest (GOI) inserted in recombinant plasmid vector? [06]

OR

- (B) Discuss the technique of *manniatis et al.*, along with the improvised method for cDNA library preparation. [06]
Q-5 (A) Explain in detail how non-radioactive probes are prepared and is detected? [06]
(B) Discuss the steps and procedure of Northern blotting along with the figure. [06]

OR

- (B) Explain the mechanism of Fluorescence in situ hybridization (FISH) and write its application. [06]
Q-6 (A) Explain PCR base method to induce site directed mutagenesis. [06]
(B) Describe sub-cloning. [06]

OR

- (B) Discuss Nested deletion in detail. [06]

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(2)