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SARDAR PATEL UNIVERSITY
BACHELOR OF SCIENCE (B.SC.)
V^TH SEMESTER EXAMINATION DECEMBER 2020
SATURDAY, 26th DECEMBER 2020
2:00 TO 4:00 pm
SUBJECT: GENETICS
COURSE: US05CGEN22
(Genetic Engineering-I)

DURATION 2 HRS.   **TOTAL MARKS: 70**

Figures to the right indicate marks:

Q1. Multiple Choice questions: All questions are compulsory.   **(1 x 10 = 10)**

i) Restriction enzymes were discovered by :
A) Meselson & Lederberg   B) Smith & Keeley
C) Nalhans & Meselson   D) Arber, Smith & Nathans

ii) Which of the following bonds are joined by DNA Ligase:
A) Hydrogen bonds   B) Glycosidic bonds   C) Covalent bonds   D) Phosphodiester bonds

iii) Transfer of T-DNA from Ti plasmid into plant cell is mediated by
(A) mob gene   (B) vir gene   (C) nif gene   (D) octopine gene

iv) "COS" site present in cosmids serves to provide:
A) Restriction site   B) Cohesive ends   C) Both A and B   D) Multiple cloning site

v) Cells ready for transformation are known as:
A) Pre-transformed cells   B) Ready cells   C) Competent cells   D) None of these

vi) The technique of using DNA Projectiles for transformation is called:
A) Electroporation   B) Electrosonoporation   C) Electroinjection   D) Electromigration

vii) Which blotting technique is used for RNA?
A) Southern   B) Western   C) Northern   D) None of these

viii) Probes are generally used in genetic engineering for:
A) Detection & identification of nucleic acid sequences   B) Sequencing of DNA
C) Amplification of DNA   D) None of the above

ix) Pairing of two polynucleotide from different source means :
A) Attachment   B) Denaturation   C) Hybridization   D) Blotting

x) The Southern blotting technique was first developed by:
A) E.M Southern   B) Karry Mullis   C) Kohler & Milstein   D) George Hopkins

Q2. Fill in the blanks: Each question in this part is compulsory and carries 1 mark each.   **(08 Marks)**

1. To protects the DNA from the action of DNases it is stored in _____ .

2. The adaptor molecule have one blunt end bearing 5' phosphate group & a cohesive end which is not phosphorylated. (True/False).

3. A _____ vector can replicate in two different hosts.

4. The size of bacteriophage lambda genome is 52 kb. (True/False).

5. Hairpin loop formation is a feature in cDNA Library. (True/False).

6. The full form of FISH is _____ .

7. GEAC stands for _____ .

8. The technique in which micro needles are used to deliver the DNA into the cell is called _____ .

Q3. Short Answer type questions (Attempt any TEN)   (10 x 2 = 20 marks)

i.) What are the main features of Linkers and Adapters?

ii.) What are the applications of reverse transcriptase?

iii) Why TE is preferred for long term storage of DNA?

iv) What are the main limitations of pBR322?

v) Briefly explain "in vitro packaging".

vi) What is the importance of biosafety guidelines?

vii) How genetic engineering is beneficial in agriculture?

viii) Define transformation. Enumerate two physical methods of transformation

ix) What are the advantages of genomic library?

x) .Define Hybridization and blotting.

xi. Give a diagrammatic representation of colony hybridization.

xii.) What are probes? What is their main significance?

Q4. Long answer type Questions: Attempt any four. Each question carry eight marks. (4Q x 8M = 32 Marks)

1. Explain plasmid DNA isolation by alkali lysis method with flow chart.

2. Give a comparative account of all three classes of Restriction Endonucleases. Mention Applications of Restriction enzymes.

3. Explain with relevant diagram λ-replacement and λ-insertion vector with example.

4. Write short notes on:

   A. Give comparative account of pBR322 and pUC.
   B. What are the properties and applications of vectors in genetic engineering?

5. Explain any two methods of recombinant selection and screening.

6. Explain any two transformation methods in detail.

7. Write a note on non-radioactive probes with example and significance.

8. Explain construction of genomic library with diagram and its advantages.

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