[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 6460 **L**

Unique Paper Code : 3184001001

Name of the Paper : Concepts in Biotechnology

Name of the Course : **B.Sc. (Hons) Biomedical Science**

Semester : II

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. Question no. **1** is compulsory.
4. Give illustrations and examples wherever required.
5. Subparts of the questions should be attempted together.

Q 1. (a) Define the following (**any 5**) (2x5=10 marks)

(i) A plasmid carrying genes for antibiotic resistance.
(ii) A genetic element that can exist both independently and integrated into the host chromosome.
(iii) Introduction of foreign DNA into eukaryotic cells.
(iv) A short synthetic DNA fragment containing restriction sites used for ligation.
(v) An enzyme that removes nucleotides from the ends of DNA molecules.
(vi) A colored compound used to monitor the progress of electrophoresis.

Q 1. (b) State True or False and justify (4x2=8 marks)

(i) A promoter sequence is essential for efficient gene expression in an expression vector.
(ii) Different conformational forms of plasmid DNA may appear as multiple bands on agarose gel electrophoresis.
(iii) A shuttle vector is designed to function in only one type of host organism.
(iv) A cDNA library represents only a portion of the sequences present in a genomic library.

Q 2. (a) Differentiate between the following (3x3=9 marks)

(i) Cloning and Expression vector
(ii) Two strain and single strain in-vitro lambda packaging
(iii) Blunt end and Sticky end ligation

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Q 2. (b) Write short notes on (**any 3**) (3x3=9 marks)
(i) Alkaline lysis method of Plasmid isolation
(ii) Non-viral vectors in gene therapy
(iii) Restriction Mapping
(iv) Real Time PCR

Q 3. (a) Give role/Significance of the Following: (6x2= 12 marks)
(i) Calcium Chloride in transformation
(ii) Taq DNA polymerase
(iii) T4 DNA ligase
(iv) Lac Z' Gene
(v) Magnesium in PCR
(vi) Isopropanol

Q 3. (b) What are the key features of an expression vector. What are the challenges associated with cloning a heterologous gene in *E coli.* (6 marks)

Q 4. (a) Give schematic represenattion of: (3x4=12 marks)
(i) Western Blotting
(ii) Multiplex PCR
(iii) Recombinant Insulin

Q 4. (b) What are the ethical concerns in case of genetically modified orgamisms and their use for commercial purposes? Enumerate with examples. (6 marks)

Q 5. (a) What is DNA profiling? Explain its application with example. (6 marks)

Q 5. (b) Explain in detail the technique of DNA profiling with the help of a diagram. (6 marks)

Q 5. (c) What are the factors to keep in mind while designing primers for a PCR reaction? (6 marks)

Q 6. (a) Compare and contrast the features of a plasmid vector to those of a phage lambda vector. Give examples. (6 marks)

Q 6. (b) Give the principle of any one DNA sequencing method. (6 marks)

Q 6. (c) What are lambda replacement and lambda insertion vectors. Give examples (6 marks)