JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION - 2024

M.Sc-II Semester (BT)

COURSE CODE (CREDITS): 18MS1BT313 (3) MAX. MARKS: 25

COURSE NAME: RECOMBINANT DNA TECHNOLOGY

COURSE INSTRUCTORS: Dr. Rahul Shrivastava MAX. TIME: 1 Hour 30 minutes

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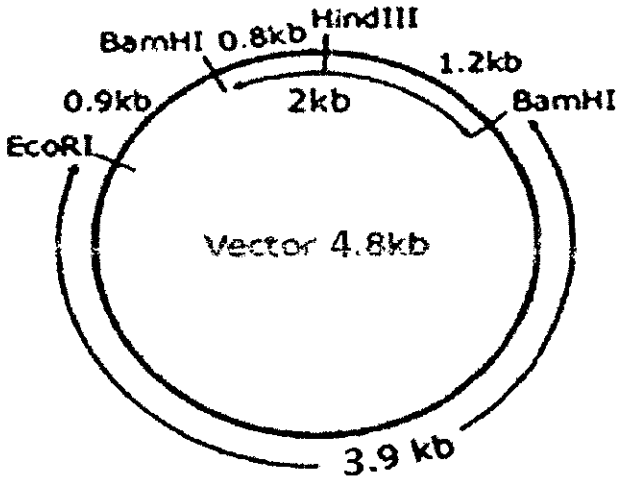
Note: (a) All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

Q1. The diagram represents a 2 Kb insert successfully introduced between two BamHI sites of a 4.8 Kb vector in the desired orientation. The HindIII sites on the insert and EcoRI site on the vector are also indicated.



a. Calculate size of DNA product obtained after digestion with EcoRI [1]

b. Calculate size of DNA product obtained after digestion with BamHI [1]

c. Calculate size of DNA product obtained after digestion with HindIII [1]

d. Calculate size of DNA product obtained after double digestion with EcoRI and HindIII [1]

e. Draw a well labeled agarose gel showing different product/digested product(s) obtained from a, b, c, and d. [3]

Q2. A PCR needs to be performed for the identification of *Mycobacterium tuberculosis* MPT-64 DNA sequence in urogenital tuberculosis patients. The PCR yields a specific 670-bp product. Primers used for the amplification are:

Forward Primer - 5' TAGATTACCGTCAGCGGCACA

Reverse Primer - 5' GTTCATAGAACATGACTGCCCG

a. Calculate the Tm of the primers. **[2]**

b. Design a PCR cycle for amplification of the 670 bp product **[3]**

c. Calculate the amount of PCR product that would be obtained after 4 cycles if the initial amount of gene product is 25 ng. **[2]**

Q3. Write Short Notes on: **[2 X 3 = 6]**

a. TA Cloning
b. Shuttle Vector
c. Directional Cloning

Q4. Provide a flow chart along with a suitable diagram and description of **Insulin** production using Recombinant DNA Technology. **[5]**