

U.G. 5th Semester Examination-2020
Molecular Biology & Biotechnology

[HONOURS]

Course Code : MBBT-H-CCR-T-12
(Recombinant DNA Technology)

Full Marks : 40

Time : 2½ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** questions: 2×5=10
 - a) What is shuttle vector?
 - b) What is reverse transcriptase? Name the source from where this was first purified.
 - c) What do you mean by the term RFLP?
 - d) What characteristics must a cloning vector have?
 - e) How can we visualize the DNA within the gel?
 - f) What do you mean by bidirectional cloning?
 - g) What do you understand by selection marker? Give one example.
 - h) What is site directed mutagenesis?

2. Answer any **two** questions: 5×2=10
 - a) What are neoschizomers and isoschizomers? Explain with examples. $2\frac{1}{2} + 2\frac{1}{2} = 5$
 - b) Schematically present a strategy of cDNA library construction. 5
 - c) Outline a process of cloning using a plasmid vector. 5
 - d) Why are plasmids used as vectors? What is disarmed Ti plasmid? How binary vectors are constructed from Ti plasmid? 2+1+2=5
3. Answer any **two** questions: 10×2= 20
 - a) What is PCR? Write down the components of this reaction. Give an example of a restriction enzyme producing 3 'overhang ends. Name the organisms from which this enzyme is isolated. Write down its recognition site and indicate the cut site on DNA. Which type of restriction enzyme are used in Recombinant DNA Technology? 1+2+1+1+3+2=10
 - b) What is VNTR? Give an account on DNA fingerprinting? Briefly describe about Southern Blotting. What is its significance? To express eukaryotic gene in a bacterial cell, why cDNA is preferred to gDNA? 1+2+3+2+2=10

- c) A 4 kb fragment when digested with:
- i) Bam HI generates 3 fragments of 1.2 kb, 2.2 kb and 0.6 kb sizes.
 - ii) Eco RI generates 2 fragments of 1 kb and 3 kb sizes.
 - iii) Bam HI and Eco RI generate 1.2 kb, 0.6 kb, 1.8 kb and 0.4 kb sizes. How will you separate the digestion products to check the fragment sizes generated by above mentioned restriction enzymes? Draw the restriction digestion map of the 4 kb fragment. Give an account on insulin production by using RDT.
- d) Why is linearized plasmid vector treated with alkaline phosphatase before ligation? What would happen if insert, instead of vector is treated with alkaline phosphatase before ligation reaction? ECORI recognized GAATTC. Calculate the expected frequency of ECORI site in a 10 kb long random DNA sequence.

$$5+5=10$$

$$2.5+2.5+5=10$$
