U.G. 4th Semester Examination - 2022

Molecular Biology

[PROGRAMME]

Course Code : MBG-401-T-CC-10

(Recombinant DNA Technology)

Full Marks : 40 Time : $2\frac{1}{2}$ 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** of the following: 2×5=10

   a) The genome of bacteria is protected from the restriction endonuclease produced by it. Explain.

   b) What are oligonucleotide drugs?

   c) What kind of host will you take to ensure expression of gene of interest of eukaryotic origin?

   d) State the difference between genomic DNA and cDNA.

   e) How can you use bacteria to clean 'oil spill'?

   f) Name some pharmaceutical product derived from recombinant DNA technology.

   g) What is 'Bt cotton'?

   h) Can you use DNA fingerprinting to detect the evolutionary lineage of an organism? Explain.

2. Answer any **two** of the following: 5×2=10

   a) What is a cDNA library? How can you screen a specific DNA fragment from DNA library? 2+3

   b) Describe the process of chromosome walking. What are knockout mice? 3+2

   c) How 'star activity' alter the number and size of fragments generated by restriction endonuclease? In a double stranded DNA of 100 Kbp, how many fragments will be generated by 6 bp and 8 bp cutter restriction endonucleases considering the GC content of the DNA is 50%? 3+2

   d) Differentiate between standard agarose and low melting agarose. How will you detect your protein of interest in cellular extract using Western blot? 2+3

3. Answer any **two** of the following: 10×2=20

a) Describe the principle and process of competent cell preparation using chemical method. How can you transform a vector containing gene of interest in competent host cell? What is the principle and sensitivity limit of visualization of DNA using ethidium bromide? 4+3+3

b) Give a comparative account of YAC and BAC as vectors. Differentiate from cloning host and expression host. How will you select transformed bacteria containing a plasmid with gene of interest from a pool of transformed and non-transformed bacteria? 3+3+4

c) How can you use PCR to diagnose different viral diseases? How will you determine the protein binding regions within a DNA? What kind of scientific information can you gather by site directed mutagenesis? 3+4+3

d) Explain the principle and process of gene therapy. What kind of vectors do we use during gene therapy? State some applications of gene therapy. $5+2\frac{1}{2}+2\frac{1}{2}$

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