

OLLSCOIL NA hEIREANN, GAILLIMH
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 2000

M. Sc. Biotechnology

First Year

Second Paper

EXTERN EXAMINER Professor C M Brown
INTERN EXAMINER Internal Examiners

TIME ALLOWED: **3 hours**

ANSWER **FOUR** QUESTIONS IN TOTAL, WHICH MUST INCLUDE **TWO**
QUESTIONS FROM **BOTH** SECTION A **AND** SECTION B.

PLEASE USE **SEPARATE** ANSWER BOOKS FOR EACH SECTION.

SECTION A

1. Describe the methodology used for the construction of large-insert genomic DNA libraries using the yeast artificial chromosome vector system.
2. Write an essay entitled "cDNA library construction".
3. Describe the composition of a typical eukaryotic genome.
4. Write an essay describing the polymerase chain reaction (PCR) and its applications in diagnosis of disease.

SECTION B

1. Describe how you would employ integrative/suicide vectors to develop a superior tryptophan-overproducing strain of *Corynebacterium glutamicum*.
2. "The absence of sophisticated regulatory mechanisms in the lysine biosynthetic pathway of *Corynebacterium glutamicum* allows this strain to be manipulated easily for the overproduction of L-lysine." Discuss this statement and describe how you would employ classical mutagenesis and modern DNA manipulatory techniques to create a lysine-overproducing strain.
3. Write notes on both of the following:
 - (a) The development of efficient transformation methods for *Corynebacteria* species.

AND

- (b) What is the normal function of the lysine-specific permease in *Corynebacterium glutamicum* and under what conditions is its activity increased?.