國立中興大學97學年度碩士班招生考試試題

科　目：生物技術概論　　所　別：食品暨應用生物科技學系乙組

第一部份 (34%)

本科目試題共 1 頁

1. What is a stem cell? Please describe its application in cancer research. (12 points)
2. Please describe the difference between microRNAs and siRNAs. (10 points)
3. What is -omics? What is the relevance of -omics to functional foods research? (12 points)

第二部份 (33%)

1. What are immobilized enzymes? Please list three advantages of using immobilized enzymes over traditional free enzymes for industrial applications. (10%)
2. Please list at least two examples of applications of genetic engineering in food industry or agriculture. (10%)
3. Oxygen limitations are critical in aerobic cultivation of microorganisms.
   (1) Please indicate factors that limit oxygen transfer in a culture of growing cells. (8%)
   (2) Please explain why a bioreactor is better than a large flask for industrial production of baker's yeasts. (5%).

第三部份 (33%)

1. **Briefly** describe the **advantages** and **disadvantages** of the following hosts on fermentation of recombinant proteins. (13%)
   (1) *Sacchromyces cerevisiae* (2) *lactococcus lactis*
   (3) *Escherichia coli* (4) *Bacillus subtilis*
2. **Explain** the following terms **briefly**.(10%)
   (1)cDNA library (2) shuttle vector (3) 2-dimentional gel electrophoresis
   (4) protein engineering (5) site-directed mutagenesis
3. An open reading frame (ORF) of gene X is about 2 kilobase in a plant cell chromosome, the protein encoded by this ORF is about 45-50 kiloDalton. Based on the observations, describe the protocols to clone the gene, express in a bacteria host cell extra-cellularly, and how to detect the expressed protein? (10%)