※ 考生請注意：本試題 □可 ☑不可 使用計算機　（請勿在本試題紙上作答，否則不予計分）

1. Spell the full name of the following abbreviations (e.g. RNA: Ribonucleic acid). Your answers **in English only.** (10%)

i) cDNA: _____

ii) nucleotide G: _____, A: _____, T: _____, C: _____

iii) RT/PCR: _____

iv) amino acid Thr: _____, Asn: _____, Asp: _____, Ile: _____,

2. Define the following terms:　　　　　　　　　　(15%)　（請勿在本試題紙上作答，否則不予計分）

i) Sigma factor:

ii) Transcriptome:

iii) Prion:

iv) Gain-of-function:

v) Lucine zipper
:

3. Describe the role of intron and exon in the alternative splicing of RNA transcripts, and how alternative splicing affects the generation of mature proteins and their potential functions. Give an example of a gene of your interest. (15%)

4. Describe how proteins are modified at the post-translational level. Your answer should include at least 2 methods of protein modifications. You need to include how the protein function and stability are affected. (10%)

5. Sepsis is a serious medical condition due to infection that leads to inflammatory state in the body. Cancer patients may die of infection rather than cancer itself. Describe the underlying self-defense mechanisms in the human blood that allows us to fend off invading microorganisms and meanwhile generate the inflammatory responses. (15%)

6. You have purified a protein called "cardo" from patients with cardiomegaly. This protein is 100 kDa, and has 2 isoforms of 60 and 30 kDa, respectively. This protein appears to be involved in heart failure. Describe step-by-step regarding how you will clone the gene for this protein and determine the protein functions both *in vitro* and *in vivo*. You may use illustrations to address your points. (20%)

（背面仍有題目,請繼續作答）

系所組別： 分子醫學研究所
考試科目： 分子生物學　　　　　　　　　　　　　　　　考試日期：0308，節次：1

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7. Describe how small interference RNA and microRNA are generated and how they work. (15%)

8. Bonus question (10%) – You will get a bonus score if you answer this question.

The impact factor of a journal is calculated based on a two-year period. It can be viewed as the average number of citations in a year given to those papers in a journal that were published during the two preceding years. For example, the 2003 impact factor of a journal would be calculated as follows:

A = the number of times articles published in 2001-2 were cited in indexed journals during 2003

B = the number of "citable items" (usually articles, reviews, proceedings or notes; not editorials and letters-to-the-Editor) published in 2001-2

2003 impact factor = A/B

It is sometimes useful to be able to compare different journals and research groups. For example, a sponsor of scientific research might wish to compare the results to assess the productivity of its projects. An objective measure of the importance of different publications is then required. The number of publications and citation statistics are two obvious candidates for such an objective measure. However, the use of such measures in general and the impact factor in particular is still a matter of debate. Numerous criticisms have been made of the use of an impact factor. Besides the more general debate on the usefulness of citation metrics, criticisms mainly concern the validity of the impact factor, how easily manipulated it is and its misuse.

The above information is adapted from a journal.

Once accepted in the graduate school, you will soon be involved in doing research and publishing your work. State your opinion about the journal impact factors.