

系所組別： 分子醫學研究所

考試科目： 分子生物學

考試日期：0220，節次：1

※ 考生請注意：本試題 可 不可 使用計算機

- 1) During DNA replication, errors occur. To ensure replication fidelity, a DNA polymerase does the proofreading in addition to replicating DNA. Please (a) name a DNA polymerase, and use diagrams to explain (b) how this DNA polymerase replicates DNA and (c) proofreads replication errors. (15 points)
- 2) In addition to DNA polymerases, a repair system also corrects replication errors. Please (a) name a system that repairs replication errors and (b) use a diagram to explain how this system repairs the errors? (15 points)
- 3) Several classes of small non-coding RNA molecules have been reported to involve in the post-transcriptional regulation of many higher eukaryotic genes. Please (a) name two classes of such molecules, (b) list the known mechanism(s) for each class participating in modulating gene expression at post-transcriptional level and (c) discuss the therapeutic potential of using such molecules for treating human diseases. (20 points)
- 4) Please describe (a) the function of the three eukaryotic RNA polymerases and (b) the characteristics of the promoter recognized by each RNA polymerase. (20 points)
- 5) Describe (a) the machinery of protein translation and synthesis, and (b) the possible mechanisms that are involved in the synthesis of defective proteins. Writing in **English only!!** (15 points)
- 6) Describe protein post-translational modifications and the significance of the modification events. Give at least 2 examples. (15 points)