

UNIVERSITY OF OSLO

Faculty of Mathematics and Natural Sciences

Exam in: **MBV2010 Molecular Biology**

Day of exam: **June 7, 2006**

Exam hours: **9:00-12:00 (3 hours)**

This examination paper consists of **2** pages.

Appendices: **None**

Permitted materials: **None**

Make sure that your copy of this examination paper is complete before answering.

Numbers in brackets indicate the maximum number of points for each question. The maximum number of points for the entire exam is 50.

1. In which molecular processes are the following proteins involved

RNA polymerase III
DNA polymerase III
Catabolite activator protein (CAP)
Photolyase
Ku-proteins
Aminoacyl-tRNA synthetase
MutH
Ras protein
Telomerase
Ribonuclease P

(10)

2. a) What is hypermutation? Describe an example in which hypermutation is important. (5)
b) Describe the mutagenic effect of heat on DNA and how mutations caused by heat are repaired. (5)
c) How is bacteriophage lambda DNA integrated into the genome of *E. coli*? (5)
3. a) Why must DNA replication be primed? Describe the priming process in *E. coli* and in the nucleus of eukaryotes. (5)
b) Which elements are found in the origin of replication in *E. coli* and in yeast? Explain the function of these elements. (5)
c) Name all the proteins involved in DNA replication and explain briefly (1-2 sentences) their function. (5)

4. a) Describe transcription initiation in *E. coli* and point out the differences between bacterial and eukaryotic initiation of transcription. (5)
- b) Explain ways in which transcription initiation can be regulated in bacteria and in eukaryotes. (5)