

# UNIVERSITY OF OSLO

Faculty of Mathematics and Natural Sciences

Exam in: **MBV2020 Laboratory course in biochemistry and molecular biology**

Day of exam: **June 8, 2011**

Exam hours: **14:30-16:30 (2 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 60.

1. What were the following compounds used for in the MBV2020 course?

(answer in 1-2 sentences)

- a) Sodium hydroxide (NaOH)
- b) RNase A
- c) T4 DNA ligase
- d) GFX microspin column
- e) Coomassie blue R-250

(5)

2. Which of the following statements are **false**?

- a) SDS denatures DNA.
- b) Proteins can be stained with bromphenol blue.
- c) DNA can be damaged by exposure to UV-light.
- d) DNA can be precipitated with 70% ethanol and salt.
- e) The *lacZ* gene codes for  $\beta$ -galactosidase.
- f) DNA is normally positively charged.
- g) Competent cells can be transformed more easily than non-competent cells.
- h) Phenol is used to extract DNA from cell extracts.
- i) Small DNA fragments are most efficiently separated in 0.5% agarose gels.
- j) Proteins are normally separated in polyacrylamide gels.

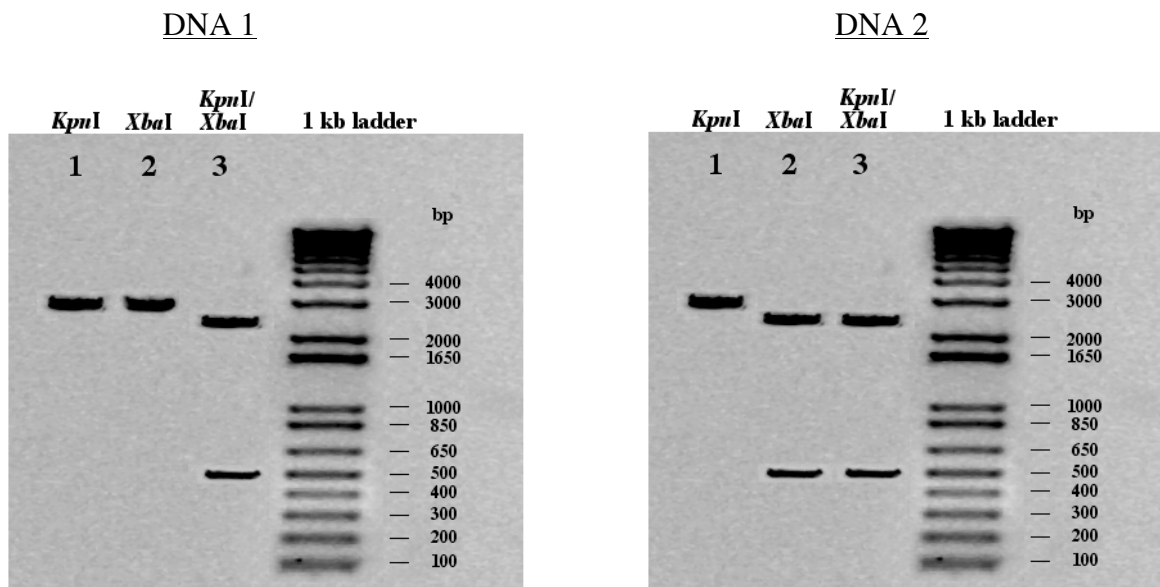
(10)

3. a) Describe the main steps in plasmid isolations from *E. coli*. (10)

b) Plasmids that are used as cloning vectors have certain features.  
What are those features?  
(Make a list or use a drawing to point out important features.) (5)

c) Explain why these features are important for cloning vectors. (10)

4. Two different DNA samples (labeled DNA 1 and DNA 2) were incubated with the enzymes *KpnI* and *XbaI* and the resulting DNA fragments visualized in two separate agarose gels, as shown below.



Try to answer the following questions:

a) What were the original sizes of DNA 1 and DNA 2 ? (5)

b) Are the original two DNAs circular or linear molecules? Explain. (5)

c) Draw restriction maps of the two DNAs, indicating the relative positions of the *KpnI* and *XbaI* restriction sites that would explain the results of the digestions. (10)