Examination paper for BI2015 Molecular Biology

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Date
Signature
**Question 1 (20%, every sub-question counts 2%)**

Explain the following terms in a single sentence:

a) DH5α
b) SDS PAGE
c) PCR
d) Isoelectric focusing
e) Nuclease
f) pGLO
g) α helix
h) Arabinose operon
i) Lysozyme
j) TE buffer

**Question 2 (30%, a counts 10%, b counts 20%)**

a) Describe two different methods to transform pGReen (with Chloramphenicol resistance marker) into E.coli cells and how you detect successful transformation.
b) Use the attached vector map to calculate the fragment sizes (in bp) generated by digesting the vector pGReen 0029 with the following combinations of restriction enzymes.
   - Digest 1: HindIII / PSTI
   - Digest 2: PSiI / BSMB1
   - Digest 3: DRAIII / MSCI / HINDIII

**Question 3 (25%, a counts 10%, b counts 15%)**

a) List and explain briefly five characteristics a protein expression vector must have.
b) Describe the production and purification of a recombinant protein starting with mRNA transcription. Assume you use a GFP tag for purification.

**Question 4 (25%, a counts 10%, b counts 15%)**

a) You want to prepare a PCR reaction. What reagents do you need? What are their functions? Suggest a standard PCR program.
b) You have performed a PCR reaction, but instead of one product several unspecific ones are visible on the gel. Which possibilities do you have to increase the specificity of the reaction?
Vedlegg 1: