

EXAMINATION

4328/9002 1
Applied Genetics

18.02.2016

Time: 3 hours

Language: English

Pages : 2

Aids: Digital exam

Notes: Part A and part B count 50 % each

Attachments: *none*

The examination results will be made available at StudentWeb

ENGLISH

Part A

1. How can you test the quality (integrity) of extracted DNA and how do you evaluate your results?
2. Why is exon sequencing used more than whole genome sequencing in medical genetics
3. Why do the police use microsattelites for identification purposes?
4. What is annealing temperature in PCR and why is it important to have optimal annealing temperature?
5. What are the differences between a SNP and a length polymorphism?
6. Describe briefly the principles of DNA extraction.
7. What is the difference between dNTP and ddNTP?
8. How does an Allele-discrimination (AD-assayTM) PCR work
9. How can you use a restriction enzyme in a SNP analysis?
10. Why is it important to always use a positive control in RFLP?

Part B

Question 1

You are employed at a company offering genetic tests for pets. A customer comes in with a blood samples (EDTA tubes) from four race horses (the samples are labelled 1,2,3 and 4). He would like to have the following questions answered:

- A. Are the four horses related?
- B. There is a gene called *SPEAD* that has a SNP (A/C). Horses that are homozygote for the C allele (variant allele) has been known to win more races. What are the genetic profiles for each of the four horses for the *SPEAD* gene?
- C. A lot of racehorses have leg injuries due to hard training. There is a length polymorphism in a gene called *LAME* (200bp is the wt allele and 340bp is the variant allele). Horses that are either heterozygote or homozygote for the length polymorphism (340bp) in the *LAME* gene are more prone to leg injuries. What are the genetic profiles for the four horses for the *LAME* polymorphism?

What kind of methods would you choose to be able to answer all of his questions? You must justify your choices and briefly describe all the methods that you need to use.

Question 2

1. Describe the physical and biochemical basis of the function of a TaqMan probe.
2. Describe how a dissociation analysis (meting curve) is performed in a real time PCR test.
3. What factors determine the melting temperature of a PCR product?
4. What are the advantages of real time PCR over conventional PCR?