



# Høgskolen i Telemark

Fakultet for allmennvitenskapelige fag

## **Examination**

**Molecular Genetics 4326**

**20.05.2015**

Time: 4 hours

Language: English

No of pages: 2 (12 questions)

Aids: None

Remarks: All the questions have equal value. You may answer in English or in Norwegian

Attachments: None

The result will be published on StudentWeb.

## English

### Question 1.

What is the sex of:

1. A fruitfly with one X chromosome and no Y chromosomes?
2. A fruitfly with one X chromosome and two Y chromosomes?
3. A fruitfly with two X chromosomes and no Y chromosomes?
4. A fruitfly with two X chromosomes and two Y chromosomes?
5. fruitfly with one X chromosome, one Y chromosome and one set of autosomes (haploid)
6. A human with one X chromosome and one Y chromosome.
7. A human with one X chromosome and no Y chromosome?
8. A human with three X chromosomes.

Assume that all individuals have a normal number of autosomes (two sets), unless otherwise stated.

### Question 2.

Describe the four basic types of major chromosome rearrangement and their typical phenotypic and genetic consequences

### Question 3.

What are the ratios of progeny phenotypes in F1 crosses (crosses between heterozygotes) under the following conditions, and why?

- (a) Normal dominance
- (b) Lethal dominance

### Question 4.

What is meant by 'linkage' and 'crossing-over'? How may these phenomena be used to map genes?

### Question 5.

What is the function of the 5' cap in eukaryotic pre-mRNA?

### Question 6.

Describe a bacterial promoter including locations of consensus sequences. What is the purpose of the promoter?

### Question 7.

How are tRNAs linked to their corresponding amino acids?

**Question 8.**

Which components are required for protein synthesis in bacterial cells?

Hint:

Stage	Component	Function
Binding of amino acids to tRNA	Amino acids ....	Building blocks of proteins ....

**Question 9.**

Briefly describe the primary and the secondary structure of DNA.

**Question 10.**

Describe the two different categories of mutations.

**Question 11.**

Explain what kind of phenotypic effects single base substitution mutations can cause.

**Question 12.**

What kind of DNA damage (change in DNA) does Mismatch Repair (MMR) repair?

