Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

OHS – Cambridge International Examinations

Subject:AICE Level BiologyDate: **\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- |
| Self-Assess | Details |
|   | **Chapter 16 – Inherited Change Part II***This information is taken from Jones & Fosbery (JF) Ch 16 (4th Edition)*Review the objectives for this chapter page 364 and make sure you place the section “O” in your notebook under that tab. **Genetics*** *Homologous*
* *Locus*

*Alleles** *Sickle cell*

*Genotype**HbA =* *HbS =**Hb=**A and S=**HbA HbA  or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***SAQ 16.4 (6 pts)**1. If there were three different alleles, how many possible genotypes would there be?

*Homozygous**Heterozygous***SAQ 16.5 (6 pts)**1. How many of the genotypes in your answer to SAQ 16.4 are homozygous, and how many are heterozygous?

**Genotype Affects Phenotype***Sickle Cell Anemia (describe how the genotype affects the phenotype)**Sickle Cell Trait**Phenotype* Fill in chart below:

|  |  |
| --- | --- |
| Genotype | Phenotype |
| HbA HbA   |  |
|  | Normal, but with sickle cell trait |
| HbS HbS |  |

**Inheriting Genes**Outline meiosis of a heterozygous cell that produces gametes of two different genotypes of sickle cell anemia. (Figure 16.5) Will a heterozyous woman produce eggs the same way as the male as shown above? Explain.**Predict the possible genotypes of children born to a couple who are both heterozygous. Show ALL possible phenotypes and genotypes:**  Genotypes of EggsGenotypes of Sperm

|  |  |
| --- | --- |
|  |  |
|  |  |

Explain the probablitlies of this Punnet square.*Genetic Diagrams*CR =CW=

|  |  |
| --- | --- |
| **Genotype** | **Phenotype** |
| CR CR |  |
| CR CW |  |
| CW CW |  |

What colour flower swould be expected in the offspring from a red and a pink snapdragon? Fill in missing information. Offspring genotypes and phenotypes: Draw genetic diagram below. Label phenotypes and genotypes.

|  |  |  |
| --- | --- | --- |
| **Parental phenotypes** | Red |  |
| **Parental genotypes** |  | CR CR |
| **Gametes** | All CR |  |

**SAQ 16.6, page 376 a, b,and c (7pts)***Dominance** Codominance

|  |  |
| --- | --- |
| Genotype | Phenotype |
| AA |  |
| Aa |  |
| aa |  |

* Dominant
* Recessive

**SAQ 16.7 (6pts)**Symbols:Crosses: Genetic Diagram: **SAQ 16.8 (5pts)***Test Crosses*If the purple-stemmed tomato plant’s genotype is AA:If its genotype is Aa: **SAQ 16.9 (8pts)****Multiple Alleles***Multiple alleles** *Four Blood Groups-*
* *3 alleles of this gene:*
* *\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ are codominant*
* *\_\_\_\_\_\_\_\_ is recessive to both \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_.*

*Possible geneotypes and phenotypes in a diploid cell:*

|  |  |
| --- | --- |
| *Genotype* | *Blood Group* |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**SAQ 16.10 (4pts)****SAQ 16.11 (15pts)**1. i. ii.

iii. **Sex Inheritance** *Sex Chromosomes**Autosomes**Explain the difference between the two:* **SAQ 16.12 (5pts)****Sex Linkage***Factor VIII** *the two alleles fo this gene:*

*Haemophilia** *Haemophillia is aon the \_\_\_\_\_\_ chromosome. Affects the way it is inherited.*
* *Females:*
* *Males:*

*Sex-linked gene** *Genotypes are represented by:*
* *Example from text of the genotype of a woman who has the allele H on one of her X chromosomes, and the allele h on the other is written as: \_\_\_\_\_\_\_\_\_\_\_\_\_*

*Genetic Diagram to show how sex-linked genes are inheritied. What does the following diagram show?*

|  |  |  |
| --- | --- | --- |
| **Parental phenotypes** | *Normal man* | *Carrier woman* |
| **Parental genotypes**  |  |  |
| **Gametes** |  |  |

 *Offspring genotypes and phenotypes: Draw diagram and label phenotypes and genotypes.* *Probability explanation:* **SAQ 16.3 (2 pts)**1.

**SAQ 16.14 (18pts)** |
| O Inherited change**Content**• **Passage of information from parent to offspring**• **Nature of genes and alleles and their role in determining the phenotype**• **Monohybrid and dihybrid crosses****Learning Outcomes**Candidates should be able to:(a) **[PA] describe, with the aid of diagrams, the behaviour of chromosomes during meiosis, and the****associated behaviour of the nuclear envelope, cell membrane and centrioles (names of the main****stages are expected, but not the sub-divisions of prophase);**(b) **explain how meiosis and fertilisation can lead to variation;**(c) **explain the terms *locus*, *allele*, *dominant*, *recessive*, *codominant*, *homozygous*, *heterozygous*,*****phenotype* and *genotype* (see section 5);**(d) **use genetic diagrams to solve problems involving monohybrid and dihybrid crosses, including****those involving sex linkage, codominance and multiple alleles (but not involving autosomal****linkage or epistasis);**(e) **use genetic diagrams to solve problems involving test crosses;**(f) **[PA] use the chi-squared test to test the significance of differences between observed and****expected results (the formula for the chi-squared test will be provided);**(g) **explain, with examples, how mutation may affect the phenotype;**(h) **explain, with examples, how the environment may affect the phenotype;**(i) **explain how a change in the nucleotide sequence in DNA may affect the amino acid sequence in a****protein and hence the phenotype of the organism;**(j) **use the knowledge gained in this section in new situations or to solve related problems.** |