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 Eggs  Genotypes 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)**      **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.** | | |