UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE GENERAL DEGREE LEVEL II (2020 SEMESTER II)

June 2022 Examination (SC/2018)

SUBJECT: Zoology **Time: 01 ½ hours**

COURSE UNIT: ZOO 2202– Human Biology and Genetics

Answer **any three** questions only.

Illegible handwriting would be penalized.

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1. Describe adjustments shown by humans permanently living in the Arctic zone.

2. Answer both parts (*Both will be given equal weight*).

i) Briefly describe symptoms of the **two** most common mental illnesses of man.

ii) Write an account on Down's syndrome emphasizing the genetic cause and phenotypic manifestations.

3. Answer both parts.

i) Briefly explain how the inheritance of **completely linked** genes deviates from typical dihybrid inheritance. (i. *Marks 30%*).

ii) In Fruit flies, assume that the genes controlling the wing shape and the eye color are located 20 map units apart on the same autosome. Round wings (allele *R*) are dominant over long wings (allele *r*), and brown eyes (allele *B*) are dominant over white eyes (allele *b*).

(a) Briefly explain what is meant by the phrase "the two loci are 20 map units apart".

(b) Mention the genotype of fruit flies that are heterozygous for both traits.

(c) Determine the phenotypic outcomes of a test cross for fruit flies of the genotype mentioned in (b).

(d) If the test crosses produced 1000 fruit flies, predict the numbers of different phenotype categories resulting from the crosses. Mention what is unique about these numbers.

(e) Calculate the probability of getting three (03) long-winged, white-eyed flies and two (02) round-winged, brown-eyed flies from the above cross mentioned in (c). (ii. *Marks 70%)*

4. Using a mammalian example, write a detailed account on epigenetic dosage compensation of some X-linked alleles in female mammals.

****Marks from continuous Assessment (Genetics + Human Biology) (20 marks)

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