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Prelims PYQ, Mains model answers, and copy evaluation. Write to the desk for this paper, a doubt, or the AI waitlist.

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Q7(b)

What assumptions must be met for a population to be in genetic equilibrium. Explain the importance of genetic equilibrium.

UPSC Civil Services Mains 2023 · Anthropology GS 1 · 15 marks · Concept of genetic polymorphism and selection, Mendelian population, Hardy-Weinberg law

9.3 Concept of genetic polymorphism and selection, Mendelian population, Hardy-Weinberg law; causes and changes which bring down frequency-mutation, isolation, migration, selection, inbreeding and genetic drift. Consanguineous and non-consanguineous mating, genetic load, genetic effect of consanguineous and cousin marriages.

Facts & figures for this PYQ only.

Numbers move. Confirm the latest Budget, Economic Survey or census round. This sheet is for revision, not a substitute for the model answer.

<https://wrapexams.com/upsc/mains-answers/anthropology-gs-1/2023/what-assumptions-must-be-met-for-a-population-to-be-in-genetic-equilibrium-explain-the-importance-of-genetic-equilibrium/>

Hardy and Weinberg, 1908

Independently stated the equilibrium relation between allele and genotype frequencies under random mating.

$$p^2 + 2pq + q^2$$

Expected genotype frequencies for two alleles in the basic autosomal model.

Genetic drift

Random frequency change in small populations, forbidden by the infinite-size assumption.

Heterozygote advantage

Selection that maintains both alleles, as in sickle-cell and malaria, a systematic departure from equilibrium frequencies.

Inbreeding

Non-random mating that increases homozygotes relative to Hardy-Weinberg expectation.

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