



Name :

Roll No. :

Invigilator's Signature :

CS/B.Sc(H)/GENETICS/SEM-3/PEG-304/2012-13

2012

POPULATION AND EVOLUTIONARY GENETICS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

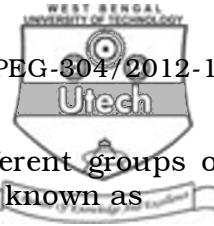
GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) Industrial melanism is an example of
 - a) Neo-Lamarckism
 - b) Natural selection
 - c) Neo-Darwinism
 - d) Mutation.
 - ii) Mutation theory was proposed by
 - a) Hugo de Vries
 - b) C. Darwin
 - c) A. Weisman
 - d) Mac Dougall.
 - iii) Charles Darwin
 - a) was the first person to conclude that organisms evolve
 - b) proposed that unused parts of the body deteriorate
 - c) eagerly published his theory before it was well developed
 - d) proposed natural selection as the mechanism of evolution.



- iv) Lamarck's theory of evolution is called
- a) theory of use and disuse of organs
 - b) descent with modifications
 - c) inheritance of acquired characters
 - d) survival of the fittest.
- v) Modern synthetic theory of evolution is based on
- a) Genetic and chromosomal mutations
 - b) genetic recombination and natural selection
 - c) reproductive isolation
 - d) all of these.
- vi) Which one of the following would cause the Hardy-Weinberg principle to be incorrect ?
- a) The size of the population is very large
 - b) Individuals mate with one another at random
 - c) Natural selection is present
 - d) There is no source of new copies of alleles from outside the population.
- vii) A gene is more than one allelic variant is said to be
- a) monomorphic
 - b) polymorphic
 - c) dimorphic
 - d) none of these.
- viii) The evolutionary effects of genetic drift are greatest when
- a) the population size is large
 - b) intraspecific competition is intense
 - c) the population size is small
 - d) intraspecific competition is weak.
- ix) According to the Hardy-Weinberg theorem, the frequencies of alleles in a population will remain constant if is the only process that affects the gene pool.
- a) mutation
 - b) genetic drift
 - c) sexual reproduction
 - d) natural selection.



- x) Classification of similar object into different groups or partitioning of a data set into subset are known as
- a) homozygosity b) clustering
c) paraphyly d) none of these.
- xi) Selection is the main force which alter the
- a) gene frequency
b) recombination frequency
c) phenotypic frequency
d) none of these.
- xii) Factors fostering selection include limits on resources. Biologists often refer to such factors as
- a) Atmospheric pressure
b) Selective pressures
c) Adaptive pressure
d) Osmotic pressure
- xiii) The condition of a locus that does not experience a change in allelic frequencies from one generation to the next is
- a) equilibrium b) disequilibrium
c) saturated state d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Differentiate between founder effect and bottle-necking.
3. State briefly about positive and negative assortative mating.

$$2\frac{1}{2} + 2\frac{1}{2}$$

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4. Discuss the Lamarck's theory of evolution.
5. Discuss how electrophoretic techniques could be used for analyzing genetic variations in a population.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

6. Discuss the evolution of eukaryotic nuclear genome. Discuss how the new genes are created. $6 + 9$
7. Although a protein shows constant rate of accumulation of amino acid changes over evolutionary time but different proteins evolve at different speeds. Explain. Discuss the evolution of gene families. $8 + 7$
8. Discuss the evidences that favour the idea that human chromosome 2 have arisen due to great apes' chromosomal fusion. What makes human different from great apes ? $7 + 8$
9. What are genetic variations ? What are their importances in evolution ? Discuss the sources of genetic variations.

$1 + 2 + 12$

