	Utech
Name :	
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Invigilator's Signature :	

CS/B.SC(H)/GENETICS/SEM-3/PEG-304/2011-12 2011

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: $10 \times 1 = 10$ i) Who wrote on the origin of species by means of natural
 - a) J. B. de Lamarck
- b) C. Darwin
- c) Weisman

selection'?

- d) E. Darwin.
- ii) Genetic drift tends to reduce genetic variability
 - a) between the populations
 - b) within a small population
 - c) within a large population
 - d) in another population.
- iii) The study of the fossil plant is known as
 - a) Palaeontology
- b) Palaeobotany
- c) Palynology
- d) none of these.
- iv) Out-crossing is the avoidance of mating between
 - a) related individuals
- b) unrelated individuals
- c) different species
- d) none of these.

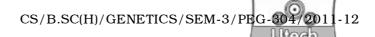
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- v) Inbreeding is actually
 - a) negative assortative mating
 - b) positive assortative mating
 - c) random mating
 - d) none of these.
- vi) 'SNP' is
 - a) sort nucleotide polymorphism
 - b) sort nuclear programme
 - c) single nucleotide polymorphism
 - d) none of these.
- vii) Mutation cause the genetic variation
 - a) increased
- b) decreased
- c) unchanged
- d) huge changed.
- 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) Which one of the following conditions is necessary for speciation to occur?
 - a) Reproductive isolation
 - b) Sympatric speciation
 - c) Adaptive radiation
 - d) interbreeding among neighbouring population.

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- x) The shape of the beak of the Darwin's finches, industrial melanism and the changes in horse teeth are all examples of
 - a) artificial selection b)
 - b) natural selection
 - c) convergent evolution
- d) homologous structures

- xi) Mutation is
 - a) the ultimate source of variations
 - b) the only form that produces adaptive evolutionary changes
 - c) the source of genetic drift
 - d) none of these.
- xii) Multigene families are important as potential sources of
 - a) Selection
- b) Evolution
- c) Genetic variation
- d) Migration.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following.

 $3 \times 5 = 15$

- 2. Albinism, an autosomal recessive trait, are easily recognized by lack of pigment in skin, hair and iris. One source estimates the frequency of Albinos as 1 in 10,000. What percentage of the population is heterozygous for this gene?
- 3. What is 'genetic equilibrium'? Explain it.
- 4. What is modern synthetic theory? Explain it.

2 + 3

- 5. Distinguish between Paraphyly and Monophyly.
- 6. What is punctuated equilibrium? What do you mean by Anagenesis? 3+2

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GROUP - C

(Long Answer Type Questions)

Answer any three of the following.



7. What is 'gene pool'? What are the implications of Hardy-Weinberg law? What assumptions must be met for a population to be in Hardy-Weinberg equilibrium? What factors do affect the rate of change in allele frequency?

1 + 5 + 4 + 5

- 8. What is 'genetic drift'? Describe the parameters of 'genetic drift'. Define causes and effects of 'genetic drift'. Compare 'natural selection' and 'genetic drift'. 2 + 3 + 4 + 4 + 2
- 9. What do you mean by 'genetic polymorphism'? Give examples. Write briefly about 'Transient' and 'Balanced' polymorphisms. State about chromosome polymorphisms in Drosophila. 3+2+6+4
- 10. State Kimura's Neutral theory of Molecular Evolution with suitable example. What do you mean by 'Catastrophism'? What are micro, macro and mega evolutions? Write the major stages of human evolution. 5+2+3+5
- 11. What is Biological Species concept? Describe some criticism of this concept. Explain Population bottlenecks and Founder effect with suitable examples. 4 + 3 + 8.

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