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Sardar Patel University
M. Sc. Genetics - Second Semester Examination
Monday, 11th April, 2016
PS02EGEN01: Population and Evolutionary Genetics (CBCS)
Time: 10:30 am to 01:30 pm

Note: Figures to the right indicate marks.
Draw diagrams wherever necessary.

Total Marks: 70

Q. 1 Multiple choice questions (All are compulsory)

[08]

- Which one of the following is a principal factor in evolutionary changes?
- (a) Natural selection (b) Artificial selection
(c) Mutation (d) Migration
- Mutation rate in diploid organisms indirectly measured by using.....
- (a) Probability (b) Large scale screening
(c) Statistics (d) All of these
- Theory of acquired character was proposed by _____.
- (a) Darwin (b) Lamarck (c) Weismann (d) Hugo de Vries
- Reproductive isolation can be _____.
- (a) Post- mating (b) Pre-mating (c) Seasonal (d) All of these
- _____ is the heart of Conservation Genetics.
- (a) Species Diversity (b) Bio-Diversity (c) Genetic Diversity (d) None of these
- Effective population size is calculated as _____.
- (a) $N_e = \frac{4(N_m N_f)}{(N_m + N_f)}$ (b) $N_e = \frac{(N_m N_f)}{(N_m + N_f)}$ (c) Both 'a' and 'b' (d) None
- The science of animal behavior is known as _____.
- (a) Ethology (b) Ornithology (c) Anthropology (d) Ecology
- Which one of the following gene is inherited from mother _____.
- (a) IGF2 (b) CDK (c) H19 (d) CMK

Q. 2 Answer in short. (Attempt any seven)

[14]

- Define zygotic frequency and allele frequency. How they differ.
- Write the difference between directional selection and stabilizing selection
- Differentiate inter specific and intra specific genetic diversity.
- Write a short note on molecular clocks.
- What is genetic polymorphism?
- What is Genetic drift? What is its effect on population?
- Define the terms – inbreeding, inbreeding depression and genetic load.
- What CODIS stands for? Mention 3 tiers of CODIS.
- Enlist different samples used for DNA fingerprinting to identify criminal.

Q. 3 (A) State Hardy - Weinberg law. Discuss its applications in population genetics. [06]

(B) Give a detail note on heritability. [06]

OR

Define following terminology in terms of population genetics:

(B) (1) Panmictic population (3) Threshold (5) Fitness [06]
(2) Inbreeding (4) Heterosis (6) Genetic bottleneck

Q. 4 (A) Write an essay on various theories of evolution. [06]

(B) Give a detail note on evolution of prokaryotes and eukaryotes. [06]

OR

(B) What is speciation? Add a note on the types of speciation. [06]

Q. 5 (A) Explain how conservation of genetic diversity is essential to species survival. Add a note on the types of conservation. [06]

(B) Write a note on : i. Loss of genetic diversity [06]
ii. Identifying genetic diversity

OR

(B) 'Population size has a major impact on species survival' justify. Give a note on population fragmentation. [06]

Write short notes on the following:

Q. 6 (A) (i) Imprinting phenomena [06]
(ii) Sociobiology

(B) Discuss DNA comparisons in forensic sciences. [06]

OR

(B) Discuss Protein comparisons in forensic sciences. [06]

*****Best wishes*****