

## QUESTION BANK PART II BIOLOGY

### Chapter 24

#### Short questions:

1. What is genetic drift? (LB-2010, 2011, 2012, 2021)

**Genetic Drift:** The changes in frequency of alleles at a locus by chance are called genetic drift. Actually it is the disappearance of particular genes from the population.

**Effect of Genetic Drift on Population:**

- In small populations, fluctuation may lead to the loss of particular alleles.
- It occurs in a small population when few individual fail to reproduce. Thus the genes are lost from population.

2. What are hydrothermal vents? How do they support life?

**Hydrothermal vents:** Hot springs present in underwater in the deep oceans are called hydrothermal vents. These are supposed to have provided energy and raw material for beginning of life on earth.

3. What are modern synthesis/ Neo-Darwinism? (OR) Give the concept of Neo-Darwinism. (LB-2012, 2014)

**Neo-Darwinism:** The theory of evolution as proposed by Darwin has been modified in the light of modern evidences of genetics, molecular biology, paleontology, cytology, ecology and is known as neo-Darwinism or synthetic theory of evolution.

4. Write the name of theories of evolution presented by Lamarck and Darwin. (LB-2011)

**Lamarckism:** According to Lamarck. **Inheritance of Acquired Characters**

- The parts of the body used extensively become large and stronger(long neck of giraffe), while those not used, deteriorate with passage of time(loss of legs in snakes)
- These acquired characters passed along to the offspring.

Lamarck's second point was disproved experimentally.

Darwin gave **The origin of Species**

- Descent with modification
- Natural selection and modification

5. What are vestigial organs? Name some important vestigial organs of man. (OR) What are vestigial organs? Give one example (LB-2010, 2012, 2014, 2018)

**Vestigial organs:** Vestigial organs are historical remnants of structures that had important functions in ancestors but no longer essential presently. e.g. appendix in carnivores, ear muscles in man are the vestigial organs.

6. Define the term Neo-Darwinism. (LB-2018)

**Neo-Darwinism:** The theory of evolution as proposed by Darwin has been modified in the light of modern evidences of genetics, molecular biology, paleontology, cytology, ecology and is known as neo-Darwinism or synthetic theory of evolution.

7. Define fossil. Where are most of the fossils found? (LB-2014)

**Fossils:** The fossils are either actual remains or traces of organisms or impressions or cast made by the body parts



of organisms that lived in ancient times. Fossils help in studying evolution.

8. Define endosymbiont hypothesis.

**Endosymbiont Hypothesis:** This hypothesis was proposed by Margulies. According to this hypothesis a photosynthetic, aerobic, eukaryotic organism might have evolved when a large anaerobic prokaryotic amoeboid ingested a small aerobic bacteria and stabilized it, so it became a mitochondrion, and when it ingested a cyanobacterium and stabilized it, it became a chloroplast and when it ingested a spirochete bacterium and stabilized it, it became a flagellum.

9. Define endangered species. (OR) What are endangered species? Give examples. (OR) Differentiate between endangered and threatened species. (LB-2018)

**Endangered Species:** An endangered species is in imminent danger of extinction throughout its range.

**Threatened Species:** A threatened species is likely to become endangered in the near future.

10. Define Hardy Weinberg Theorem and give its equation in the form of binomial expansion. (LB-2013)

**Hardy-Weinberg Theorem:** It states that the frequency of alleles and genotypes in a population's gene pool remain constant over the generations unless acted upon by agents other than sexual recombination. So shuffling of alleles due to meiosis and random fertilization has no effect on the overall genetic structure of a population.

11. Differentiate between homology and analogy. (LB-2013)

**Homology:** Similarity in characteristics resulting from common ancestry is known as homology and these similar anatomical structures are known as homologous structures. e.g. forelimbs of man, bat, horse, whale, etc have same internal structure showing their common ancestry.

**Analogy:** The presence of analogous organs is termed as analogy. Organs which are functionally alike but structurally different are called analogous organs.

12. Differentiate between homologous and analogous organs. (OR) Define homologous organs by giving examples (LB-2011, 2012)

Homologous Organ	Analogous Organ
<ul style="list-style-type: none"> <li>Homologous organs are functionally different but structurally alike.</li> <li>Homologous organs show divergent evolution.</li> <li>Homologous organs have common evolutionary origin.</li> <li><b>Example:</b> The arms, wings flippers and forelegs of different vertebrates are homologous organs.</li> </ul>	<ul style="list-style-type: none"> <li>Analogous organs are functionally alike but structurally different.</li> <li>Analogous organs show convergent evolution.</li> <li>Analogous organs do not have common evolutionary origin.</li> <li><b>Example:</b> Wings of birds and wings of insects.</li> </ul>

13. Name any four factors affecting gene frequency. (LB-2013)

**Factors affecting the gene frequency:** These are

- Mutation
- Migration
- Genetic drift
- Non-random mating

14. State/define theory of special creation. (LB-2014)

**Theory of special Creation:** According to this theory all living things came into existence in their present forms especially and specifically created by nature. The persons of this thought are called creationists.



**15. What is membrane invagination hypothesis? (LB-2019)**

- According to this hypothesis, the prokaryotic cell membrane invaginated
- It enclosed the copies of its genetic material in the invagination.
- Several double membrane bound entities (organelles) were formed by this invagination in a single cell.
- These entities then changed into the eukaryotic mitochondria, nucleus, chloroplast etc.

**16. What is Hardy-Weinberg Theorem? (LB-2019)**

It states that “the frequencies of alleles and genotypes in a population’s gene pool remain constant over the generations unless acted upon by agents other than sexual recombination”. OR

“Under certain conditions of stability both allelic frequencies and genotypic ratio remain constant from generation in sexually reproducing organism”.

- In fact the Hardy- Weinberg equation is a binomial expression

$$(P+q)^2 = P^2 + 2Pq + q^2$$

**17. Differentiate between homologous and analogous organs. (LB-2021)**

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