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BIOLOGY

N-314

**Chapter wise Reference Book
Including Many Solved Sample Papers**

Based on

N.I.O.S. Class – XII
National Institute of Open Schooling

By : Dr. Meenakshi Bhardwaj & Gargi Bhardwaj



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Based on: **NATIONAL INSTITUTE OF OPEN SCHOOLING - XII**

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**Sample Preview
of the
Solved
Sample Question
Papers**

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Solved Sample Paper - 1

Based on NIOS (National Institute of Open Schooling)

Biology - XII

Time : 3 Hours

Maximum Marks : 80

- Note :** (i) This Question Paper consists of 30 questions.
(ii) All questions are compulsory.
(iii) Marks for each question have been indicated against it.
(iv) Each questions from Question Nos. 1 to 8 has four alternatives – (A), (B), (C) and (D), out of which one is most appropriate. Choose the correct answer among the four alternatives and write it in your answer-book against the number of the question. No extra time is allotted for attempting multiple-choice questions.

Q. 1. Pick the odd one out:

- (a) UAA
- (b) AUG
- (c) UAG
- (d) UGA

Ans. (b) AUG.

Q. 2. Which of the following is a true fish?

- (a) Dogfish
- (b) Jellyfish
- (c) Starfish
- (d) Silverfish

Ans. (a) Dogfish.

Q. 3. The type of placentation seen in *Bhindi* is:

- (a) Marginal
- (b) Parietal
- (c) Superficial
- (d) Axile

Ans. (d) Axile.

Q. 4. The narrow spectrum antibiotic used against few pathgenic bacteria is:

- (a) Erythromycin
- (b) Tetrachline
- (c) Streptomycin
- (d) Chloramphenicol

Ans. (c) streptomycin.

Q. 5. Sea anemone, a Cnidarian, gets attached to the shell of hermit crab. This type of association is known as:

- (a) Commensalism
- (b) Parasitism
- (c) Mutualism
- (d) Neutralism

Ans. (c) mutualism.

Q. 6. Which one of the following is an example of a unicellular fungus?

- (a) Penicillium
- (b) Yeast
- (c) Mushroom
- (d) Lichens

Ans. (b) Yeast.

Q. 7. Vascular bundles that are open, conjoint with xylem in endarch condition is a characteristic of:

- (a) Dicot root
- (b) Monocot root
- (c) Monocot stem
- (d) Dicot stem

Ans. (d) Dicot stem.

Q. 8. A Cross between the F1 progeny and a homozygous recessive parent is known as:

- (a) Testcross
- (b) Reciprocal cross
- (c) Monohybrid cross
- (d) Dihybrid cross

Ans. (a) Testcross.

Q. 9. Why does insectivorous plant eat insects when it is capable of carrying out photosynthesis?

Ans. The insectivorous plants grow in soil which do not contain sufficient nitrogen mineral. These plants (e.g. pitcher plant) are green and carry out photosynthesis to obtain a part of the food required by them. But they do not get the nitrogen from the soil in which they grow. So, insectivorous or carnivorous plants feed on insects to obtain the nitrogen needed for their growth.

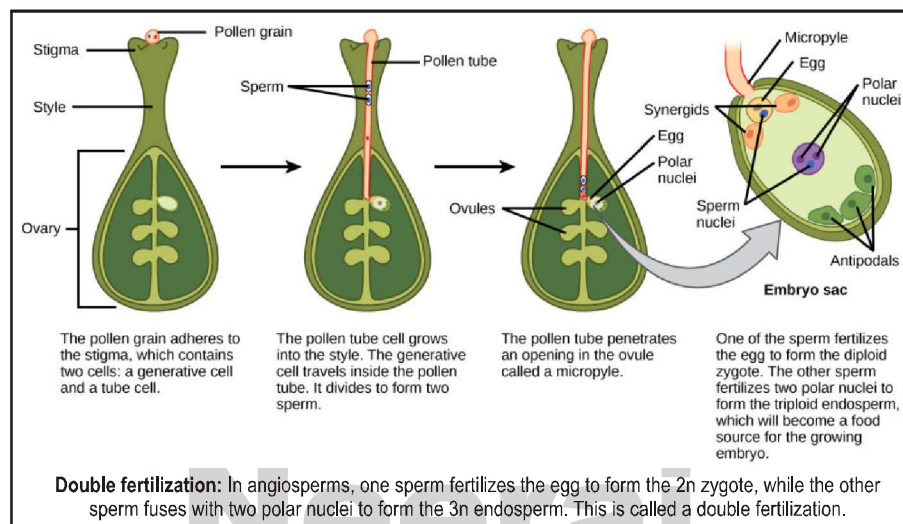
Q. 10. With the help of equations, briefly explain double fertilization.

Ans. Double fertilization is a major characteristic

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of flowering plants. In this process, two male gametes fuse with one female gamete wherein one male gamete fertilizes the egg to form a zygote, whereas the other fuses with two polar nuclei to form an endosperm. Double fertilization gives stimulus to the plant that re-

sults in the development of the ovary into fruit and ovules into seed. The fusion of haploid male and female gametes restores the diploid condition of the plant.



Q. 11. Define the following terms:

(a) Humus

Ans. A brown or black organic substance consisting of partially or wholly decayed vegetable or animal matter is called humus. It provides nutrients for plants and increases the ability of soil to retain water.

(b) Soil erosion

Ans. Ref.: See Chapter-27, Page No. 230, Q. No. 1 (Intext Questions-3).

(c) Terracing

Ans. Ref.: See Chapter-27, Page No. 231, Q. No. 4 (Intext Questions-3).

(d) Deforestation

Ans. Cutting down of forests for timber, or for farming purposes, or construction then it is called deforestation.

Q. 12. Chromosomal change in structure is termed as chromosomal aberration. List four types of chromosomal aberrations.

Ans. Chromosomal change in structure is also termed as **Chromosomal Aberration**. It is of four types

1. Deletion, in which a piece of a chromosome may be lost.
2. Inversion, a piece of a chromosome breaks off and rejoins in the reverse direction.
3. Duplication A part of the chromosome may get represented twice and
4. Translocation a piece from another chromosome may get attached.

Q. 13. Name the respiratory organs in cockroach and earthworm.

Ans. Respiratory organs of cockroach is tracheae and of earthworm is skin.

Q. 14. Distinguish between pioneer community and climax community.

Ans. The community that initially inhabits a bare area is called pioneer community. The pioneer community after some time gets replaced by another community with a combination of different species.

The terminal (final) stage of succession forms the community which is called climax community. A climax community is stable, mature, more complex and long lasting.

Q. 15. (a) What are transgenic plants?

Ans. By recombinant DNA techniques, plant breeders can now directly modify the DNA of plants. They can add genes from other species to the plant called transgenic plants. Examples of transgenic plants include cotton which can resist attack by worms.

(b) Name a soil bacterium which is commonly used to produce transgenic plants.

Ans. Agropacterium tumefaciens.

Q. 16. Define the following terms with appropriate examples:

(a) Multiple alleles

Ans. Some genes may have more than two alleles or multiple alleles, controlling the same trait. An example of multiple alleles is inheritance of blood group in man.

(b) Codominance

Ans. Ref.: See Chapter-22, Page No. 186, Q. No. 1(iii) (Intext Questions-2).

Q. 17. With the help of diagrams and appropriate examples distinguish between monadelphous and diadelphous stamens.

Sample Preview of The Chapter

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BIOLOGY

DIVERSITY AND EVOLUTION OF LIFE

Origin and Evolution of Life and Introduction to Classification

1

INTRODUCTION

The earth came into existence about 5 billion years ago. Earlier life was not possible due to presence of hot gases and vapours of various chemicals, gradually these cooled down and various chemical reactions occurred and hydrogen (H₂), methane (CH₄), ammonia (NH₃), water vapour (H₂O) present in atmosphere reacted to form amino acids, nitrogenous base, sugar and fatty acids which further combined to form proteins and nucleic acid and hence, lead to the origin of life on the earth surface. The primitive organisms were simpler in form, which over a course of time changed to complex form called **Evolution**. These organisms on the earth were result of descent, with modification from a common ancestor theory called *Organic Evolution*. **Charles Darwin** an English scientist explained the mechanism of Evolution through the theory of natural selection, but later on with advances in genetic the sources of variations were discovered so this theory was modified and termed as Neo-

Darwinism or modern synthetic theory, which took into consideration the variation, mutation and differential reproduction. Variation in an individual arise due to Mutation, Genetic combination gene flow and genetic drift e.g. DDT resistant mosquitoes. The variations sometimes leads to speciation, which is of two types—Allopatric Speciation and Sympatric Speciation. The earliest individual to evolve on earth are bacteria, having single chromosome and no nuclear membrane hence called prokaryotes. Organisms other than bacteria possessing well defined nucleus are called eukaryotes. R.H. Whittakar in 1969 gave the five kingdom classification of the organisms which includes Monera, Protista, Fungi, Plantae and Animalae. There was one more category called virus which poses a classification problem as they can replicate, but cannot reproduce on their own and reproduce only when inside the cell, so can be regarded as live but can be crystallised and are non-cellular so considered to be non-living. It infects bacteria, plants and animals and is highly mutating i.e. it keeps on

changing its genetic material. When virus attack bacteria it's called bacteriophage. These viruses are responsible for many diseases like Cancer, Herpes, Small pox and even AIDS etc.

INTEXT QUESTIONS-1

Q. 1. Approximately how many years ago was the earth formed?

Ans. The earth was formed about 5 billion years ago.

Q. 2. Who gave chemosynthetic theory for the origin of life?

Ans. The chemosynthetic theory of life was given by A.I. Oparin. It is by far the most widely accepted theory.

Q. 3. Name the four gases present in primitive atmosphere of earth.

Ans. Initially, on the earth NH_3 , CH_4 , H_2 and H_2O were present.

Q. 4. Name the source of energy which was used for chemical combination in atmosphere.

Ans. Life on the earth originated through a series of combinations of chemical substances and these all things happened in the water. As we all know, to carry out any reaction there need some energy and for this chemical combination to take place lightening or ultra violet rays or geo thermal energy acted as a source of energy.

Q. 5. Where did life originate in water or on land?

Ans. Origin of life means the appearance of simplest primordial life from non- living matter. For this origin of life certain series of combinations of chemical substances took place and this all happened in water.

Q. 6. What are coacervates?

Ans. Coacervates are little ball of organic matter which is formed by the repulsion of water by something like oil. During the origin of life Charles Darwin proposed that all living things may come from a single common ancestor, an "unorganism", presumably something very simple. Later on **Oparin** suggested that the first "unorganism" could have

formed from non-living organic matter called coacervate.

Q. 7. In the origin of life large molecules were formed from inorganic compounds. Name any two such large molecules.

Ans. During the origin of life the inorganic compound present in the atmosphere viz. Ammonia (NH_3) Hydrogen (H_2) Methane (CH_4) Water vapour (H_2O) went through a series of combinations and give rise to larger molecule viz. Amino acids, Nitrogenous base, sugar and fatty acids etc.

Q. 8. Name the two scientists who experimentally tried to verify Oparin's hypothesis?

Ans. There were several theories proposed to explain the origin of life, of them the most accepted one is *Chemosynthetic Theory of Origin of Life*, which was proposed by A.I. Oparin. Later on Miller and Urey, the two scientists tried to verify the hypothesis proposed by Oparin.

INTEXT QUESTIONS-2

Q. 1. Define organic evolution.

Ans. The formation of complex organisms through change from simpler ancestral type with the course of time is called *evolution*.

This process of evolution is very slow and gradual. These adaptations for survival are handed over from generation to generation. Thus, the theory of organic evolution states that all living things on the earth are here as a result of descent, with modification from a common ancestor.

Q. 2. Name one fossil animal which forms a connecting link between reptiles and aves.

Ans. Fossil animals are those animals which were once present, but with the course of evolution have become extinct. e.g. Archaeopteryx.

Q. 3. Which organ of man is homologous to the wings of birds?

Ans. The forelimb or we can say the arms of man are homologous to the wings of birds. This is an example of adaptation, where the individual adapt itself according to the environment.

Q. 4. Define vestigial organs.

Ans. Vestigial organs are those organs which were functional earlier, but with the course of evolution have become non-functional, but are still present. e.g. Appendix in human beings.

Q. 5. Give one example of a connecting link among the living beings.

Ans. Connecting links are those individuals which have some primitive characters and some complex characters, indicating the gradual evolution that took place during the course of generations.

For example egg laying mammals: In this example as we see the mammal is laying egg, but presently mammals don't lay egg, but give birth to the young ones. So this connecting link explain that earlier mammals were egg laying mammals.

Q. 6. Give two examples from molecular biology which support organic evolution.

Ans. Different examples were given to support the organic evolution, the molecular evidences are one of them. Molecular evidences of evolution can be explained as follows:

1. DNA (the hereditary material), ribosomes, the cellular organelles are of universal occurrence in organisms.
2. Cell the basic unit of life, which is made of biomolecules is also common to all organisms.
3. The sequence of nucleotides, transcription, translation are common to all organisms.

INTEXT QUESTIONS-3

Q. 1. Who gave the theory of natural selection?

Ans. Darwin gave the theory of natural selection, who is regarded as the father of evolution. According to him, all kind of organisms are related through ancestry and the mechanism for their evolution is *Natural Selection*. He proposed that in the process of natural selection, organisms produce more offsprings due to limited resources and during struggle for existence only those individuals having advantageous variations survive and reproduce while disadvantageous variantes are eliminated from the nature. This theory is also called a theory of "survival of fittest".

Q. 2. What is the modern interpretations of Darwin's theory known as?

Ans. The new theory or modern interpretations of Darwin's theory is known as "Neo Darwinism" or modern synthetic theory. Earlier Darwin gave the theory of *Natural Selection*, but later on, it was found that as the environment changes, the species adapt themselves according to environment and after many generations the adapted characters lead to the alteration of the species into a new species which is called origin of species. Darwin although talked about the variation, but didn't have idea of sources of variation. After progress in genetics, these sources of variation were discovered and Darwin's theory of natural selection was modified to Neo-Darwinism or modern synthetic theory.

Q. 3. What are the two major contributions of Charles Darwin regarding evolution?

Ans. The two major contributions of Charles Darwin regarding evolution are his two theories viz.

1. Darwin's Theory of Natural Selection.
2. Neo-Darwinism or Modern Synthetic Theory.

In the first theory he stressed on the fact of natural selection and survival of the fittest. Although this theory still hold ground, but later on with the progress of genetics and discovery of sources of variations, this theory was modified to *Neo-Darwinism* or modern synthetic theory.

Q. 4. Give two main features of Neo-Darwinism?

Ans. The change in environment lead to new adaptations in the individual, which lead to origin of new species after many generations is called the theory of Neo-Darwinism.

The two main features of this theory:

1. The unit of evolution is 'population' which has its own gene pool. Gene pool is the group of all different genes of a population.
2. The heritable genetic changes appearing in the individuals of a population are the basis of evolution.

Q. 5. What do you mean by differential reproduction?

Ans. According to the theory of Neo-Darwinism the progressive adaptations lead to the origin of new

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species after many generations and the individuals produce more offsprings with favourable genetic changes. This is called differential reproduction. This process of differential reproduction thereby helps in keeping the species distinct.

INTEXT QUESTIONS-4

Q. 1. Name the scientist who proposed

(a) Binomial nomenclature?

(b) Five kingdom classification?

Ans. (a) Binomial nomenclature means two name system of naming, of which the first part is of the genus followed by that of species e.g. Homo sapiens is the scientific name of modern man. This was proposed by **Carolus Linnaeus** who was Swedish biologist.

(b) R.H. Whittakar proposed in 1969 the 5 Kingdom Classification. The 5 kingdom are:

1. Monera, 2. Protocista, 3. Fungi, 4. Plantae, 5. Animalae.

Q. 2. Which were the first organisms to appear on earth?

Ans. Bacteria were the first organisms to appear on the earth. They were having single chromosome without nuclear membrane. Due to the presence of this type of primitive nucleus, they are termed as Prokaryotes.

Q. 3. Name the taxonomic category which comes before and after family.

Ans. The taxonomic category which comes Before family is – Order, After family is – Genus followed by species.

Q. 4. Name the categories above order level in a correct sequence.

Ans. The categories above order level in correct sequence is as follows:

- Division
- Sub-division
- Class
- Sub-class

Then comes the order.

Q. 5. Rewrite the following:

(a) Mangifera Indica – *Mangifer indica*

(b) Homo Sapiens – *Homo sapiens*

(c) Felis Leo – *Felis leo*

Ans. (a) *Mangifer indica*, **(b)** *Homo sapiens*
(c) *Felis leo*

In the above examples the mistake was that species is always written in small letter and both names should be italics or underlined if hand written.

Q. 6. Place the following in their respective kingdoms?

(a) Bacteria which curdle milk

(b) Cow

(c) Grass

(d) Amoeba

(e) Bread mould

Ans. (a) Bacteria which curdle milk – Monera

(b) Cow – Animalae

(c) Grass – Plantae

(d) Amoeba – Protista

(e) Bread mould – Fungi.

INTEXT QUESTIONS-5

Q. 1. With reference to viruses fill in the blanks (1, 2 and 3) in the following table:

1.	Tobacco	Tobacco Mosaic Disease
HIV	2.	AIDS
Herpes	human	3. ...

Ans. 1. Tobacco mosaic virus, 2. humans, 3. Herpes.

Q. 2. Give one feature because of which viruses are considered non-living.

Ans. Viruses possess nucleic acid, which is the genetic material as like living organisms, but they cannot make copies of their DNA for reproduction as their own. They can only make duplicate of their genetic material when they are inside the living cells. So they are regarded as non-living.

Q. 3. Name one chemical common to viruses and all other organisms.

Ans. Nucleic acid is the chemical common to virus and all other organisms. This nucleic acid is the genetic material used for reproduction.

Q. 4. Complete the following.

(a) Core particle of virus contains.....

(b) Coat of the virus is made of