

**SAMPLE CONTENT**

**Precise**

# BIOLOGY



*#itna hi kaafi hain*

**Std. XI  
Science**

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**Target** Publications® Pvt. Ltd.

# PRECISE **BIOLOGY**

## Std. XI Sci.

### Salient Features

- ☞ Written as per the new textbook
- ☞ Subtopic-wise segregation for powerful concept building
- ☞ Complete coverage of Textual Exercise Questions
- ☞ ‘Quick Review’ at the end of every chapter facilitates quick revision
- ☞ Reading Between the Lines is designed to impart holistic education
- ☞ Video/PDF links provided via QR codes for boosting conceptual retention

Printed at: **India Printing Works**, Mumbai

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## PREFACE

*“Education is not the learning of facts, but the training of the mind to think.” – Albert Einstein*

“**Precise Biology: Std. XI (Sci.)**” forms a part of “**Target Precise Notes**” prepared as per the **New Textbook**. It focuses on active learning along with making the process of education more interesting and builds up the students’ knowledge quotient in the process.

The **Subtopic-wise** classified format for each chapter of this book helps the students to comprehend concepts easily. Every chapter begins with the concise coverage of textual content in the format of Objectives, Question-Answers, Give Reasons, Short Notes, Diagram related questions and a host of other Objective and Subjective type of questions. The questions titled under ‘*Use your brain power*’, ‘*Can you tell*’, ‘*Can you recall*’, and various similar titles pave the way for a robust concept building. For the students to gain a better understanding of the concept behind the answer, ‘Reading between the lines’ (*not a part of the answer*) has been provided as deemed necessary. We have provided QR codes that provide video access for better conceptual understanding. Marks are allotted to give students insight about weightage of a question.

While ensuring concise coverage of the syllabus in an effortless and easy to grasp format, emphasis is also given on active learning. In addition to this, we have included sections such as, ***Reading between the lines, Quick Review and Exercise.***

Publisher

**Edition:** Third

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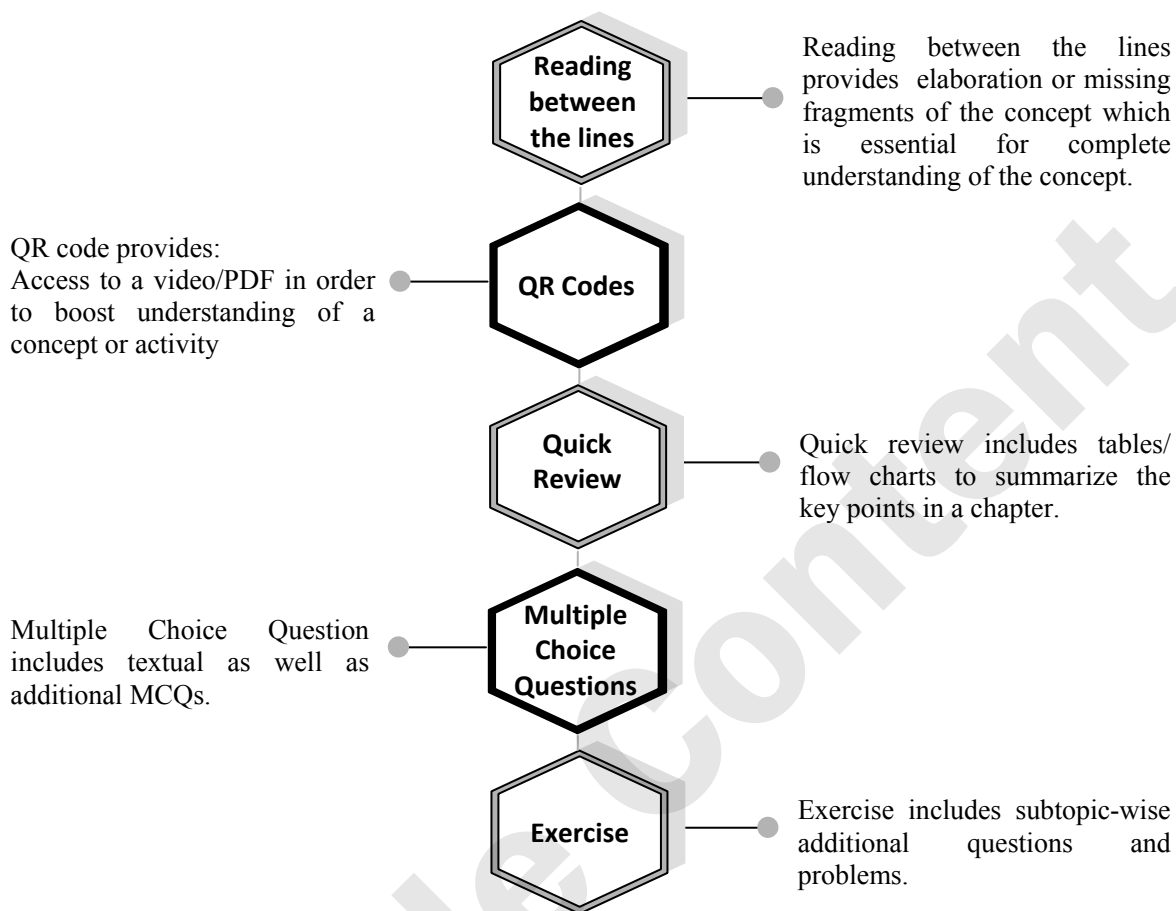
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## KEY FEATURES



# CONTENTS

Chapter No.	Chapter Name	Marks	Marks with option	Page No.
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[Reference: Maharashtra State Board of Secondary and Higher Secondary Education, Pune - 04]

- Note:**
- \* mark represents Textual question.
  - # mark represents Intext question.
  - 🔗 symbol represents textual questions that need external reference for an answer.

## Contents and Concepts

- 1.1 Basic Principles of Life
- 1.2 Herbarium
- 1.3 Botanical Gardens

- 1.4 Museum
- 1.5 Zoological Parks
- 1.6 Biodiversity Parks
- 1.7 Key

## 1.1 Basic principles of Life

**Q.1. Can you recall?** (Textbook page no. 01)

**i. What is the difference between living and non-living things?**

**[2 Marks]**

**Ans:**

	Living Things	Non-living Things
a.	Living things show growth from within.	Non-living things show growth by accumulation of materials on their surface.
b.	They reproduce asexually or sexually, except mules, sterile worker bees, infertile males.	They do not reproduce.
c.	They perform metabolism in order to obtain energy.	No metabolic changes occur in non-living things.
d.	They show irritability and respond to changes in their surroundings.	They do not show irritability.
e.	They undergo ageing and eventually die.	Non-living things do not have a finite life span.

**ii. Enlist the characters of living organisms.**

**Ans:** The characters of living organisms are as follows: Metabolism, Growth and development, Ageing, Reproduction, Death and Responsiveness.

## Reading between the lines



- a. **Metabolism:** Metabolism is breaking of molecules (catabolism) and making of new molecules (anabolism).
- b. **Growth and development:** Organisms tend to grow and develop in a well-orchestrated process from birth onwards.
- c. **Ageing:** It is the process during which molecules, organs and systems begin to lose their effective working and become old.
- d. **Reproduction:** For continuity of race (species), organisms reproduce (asexually or sexually) to produce young ones like themselves. However, mules and worker bees do not reproduce, yet are living.
- e. **Death:** As the body loses its capacity to perform metabolism, an organism dies.
- f. **Responsiveness:** Living organisms respond to thermal, chemical or biological changes in their surroundings.

**#Q.2. Can we call reproduction as inclusive character of life?** (Textbook page no. 01)

**[1 Mark]**

**Ans:** No, we cannot call reproduction as an inclusive character of life. Certain organisms like mules and worker bees do not reproduce and are still living. Thus, reproduction cannot be considered as an all inclusive defining characteristic of living organisms.



**Q.3. Can you tell?** (Textbook page no.01)

**Which feature can be considered as all-inclusive characteristic of life? Why?**

[2 Marks]

**Ans:**

- i. Metabolism can be considered as an all-inclusive (defining) feature of life since it is exhibited by all living organisms and does not take place in non-living things.
- ii. Responsiveness or irritability is a unique property of living beings since all living beings are conscious of their surroundings.

**Q.4. Think about it.** (Textbook page no. 01)

**i. Can metabolic reactions demonstrated in a test tube (called 'in vitro' tests) be called living?** [2 Marks]

- Ans:**
- a. The sum total of all the chemical reactions occurring in the body is known as metabolism and no non-living object exhibits metabolism.
  - b. However, metabolic reactions can be demonstrated outside the body in a test tube (cell-free medium).
  - c. Thus, isolated metabolic reaction (s) outside the body of an organism, performed in a test tube is neither living nor non-living.
  - d. Metabolic reactions occurring *in vitro* are living reactions but not living things.

**ii. Now a days patients are declared 'brain dead' and are on life support. They do not show any sign of self-consciousness. Are they living or non-living?** [2 Marks]

**Ans:** The brain controls all life processes. Hence, when a patient is declared as 'brain dead', he does not carry out any of the inclusive defining characters of living things (e.g. metabolism, consciousness, etc.) and is completely dependent on machines. Since, such patients do not show any sign of self-consciousness, these patients cannot exactly be called as living.

## 1.2 Herbarium

**Q.5. What is a herbarium?**

[1 Mark]

**Ans:** Herbarium is a dried plant specimen that is pressed, treated and mounted on a standard size sheet in order to preserve it.

[Note: Herbarium is a collection of dried, pressed and labelled plant specimens arranged by a classification system.]

**Q.6. Can you tell?** (Textbook page no. 03)

**What are the essentials of a good herbarium?**

[3 Marks]

**Ans:** The essentials of a good herbarium are as follows:

- i. It is essential to identify and label the collected specimen correctly.
- ii. Specimens should be stored in a dry place as well as should be dried well before preparing a herbarium in order to prevent rotting of specimen.
- iii. The plants are usually pressed and mounted on the sheet of paper known as herbarium sheets. Some plants are not suitable for pressing or mounting, like succulents, seeds, cones, etc. They need to be preserved in suitable liquid like formalin, acetic alcohol, etc.
- iv. In order to preserve the specimen for longer durations, acid-free paper, special glues and inks must be used to mount the specimen so that the specimen does not deteriorate.
- v. This following information is given at lower right corner of sheet and is called 'label';
  - a. Date, place of collection along with detailed classification
  - b. Ecological peculiarities
  - c. Characters of the plant
  - d. Local names of plant specimens
  - e. Name of the collector may be added.

**Q.7. Riya found a peculiar plant on her visit to Himachal Pradesh. What are the ways she can show it to her biology teacher and get information about it?** [2 Marks]

**Ans:**

- i. Riya can press and mount the plant specimen on a herbarium sheet and preserve the dried plant material, until she returns back from her visit.
- ii. She can also write any available information regarding the collected specimen on the herbarium sheet, which can be useful for further studies with her biology teacher.
- iii. Various taxonomical aids can be useful to get information about this peculiar plant.

[Note: In order to conserve the local flora, Riya can collect photographs of plant and describe it's structure to her teacher.]



### 1.3 Botanical Gardens

**Q.8. What are botanical gardens?**

[1 Mark]

**Ans:** Botanical gardens are places where living plants of different varieties collected from different parts of the world are grown *in vivo* in a scientific and systematic manner.

**Q.9. Why do we have green house in botanical gardens?**

[2 Marks]

**Ans:**

- Greenhouse is a structure with suitable walls and a roof in which plants are grown under regulated climatic conditions.
- The greenhouse associated with botanical gardens are also used to grow and propagate those plants that may not survive seasonal changes.

Hence, in order to provide optimum temperature for better growth and flowering and also to protect the plants from certain diseases, there are greenhouses in botanical gardens.

**Q.10. Write short note: Importance of botanical garden**

[3 Marks]

**Ans: The importance of botanical gardens is as follows:**

- It is a place where there is a collection of living plants maintained for botanical teaching and research purpose.
- Botanical gardens are important for their records of local flora.
- Botanical gardens provide facilities for the collection of living plant materials for botanical studies.
- Botanical gardens also supply seeds and material for botanical investigations.
- The development of botanical gardens in any country is associated with its history of civilization, culture, heritage, science, art, literature and various other social and religious expressions.
- Botanical gardens besides possessing an outdoor garden may contain herbaria, research laboratory, greenhouses and library.
- Botanical gardens are not only important for botanical studies, but also to develop tourism in the country.

**Q.11. Define biodiversity.**

[1 Mark]

**Ans:** Biodiversity is the degree of variation of life forms in an ecosystem.

**Q.12. Define conservation.**

[1 Mark]

**Ans:** Conservation is the act of protecting Earth's natural resources. It involves attempts to slow down, stop or even reverse the loss in the natural habitat of an organism.

**Q.13. Why does the loss of biodiversity matter? (Textbook page no. 03)**

[2 Marks]

**Ans:**

- The loss of biodiversity is a moral and ethical issue.
- Biodiversity helps to maintain stability in an ecosystem.
- The loss of even one variety of organisms can affect the entire ecosystem.

Hence, due to all these reasons, loss of biodiversity matters.

**Q.14. Write a short note on role of human beings in biodiversity conservation.**

[2 Marks]

**Ans:**

- Due to rapid increase in human population and industrialization, humans have over utilized natural resources; leading to degradation of the environment and hence only humans can help conserve the ecosystem.
- In order to conserve biodiversity and its environmental resources, humans must use the resources rationally and avoid excessive degradation of environment.
- Human beings are stakeholders of the environment and need to come together to overcome pollution and improve the environment quality in order to conserve biodiversity. E.g. Ban or limit on use of harmful products (plastic, chemicals, etc.) that are toxic to various birds, animals, etc.
- Human beings also play a role in conservation of biodiversity by establishment of various sites for in situ (national parks, wildlife sanctuaries and biosphere reserves) and ex situ (botanical gardens, culture collections and zoological parks) conservation.

**Q.15. How can you, as an individual, prevent the loss of biodiversity?**

[3 Marks]

**Ans:** As individuals, we can prevent loss of biodiversity in the following ways:

- Increasing awareness about environmental issues. Making posters that provide more information about biodiversity conservation, to raise public awareness.
- Increased support and/ or active participation in government policies and actions laid down for conservation of biodiversity.





- iii. Protect various plant and animal species in our surrounding.
- iv. Set up bird and bat houses wherever possible.
- v. Prevent felling of trees especially native plants or trees in a particular area.
- vi. Reduce, recycle and reuse resources. Especially, reduce pollution and use of plastic bags and other materials which are potential threats for the environment.
- vii. Use environment friendly products, segregate and dispose garbage correctly.
- viii. Convince people about the importance of trees and the need to participate in tree plantation campaign.
- ix. Obey the rules that fall under Biodiversity Act.

[Students can use the given points as reference and mention additional preventive measures on their own.]

**Q.16. Find out.** (Textbook page no. 04)

**Human being is at key position in maintaining biodiversity of earth. Find out more information about the following.**

**i. Laws to protect and conserve biodiversity in India.**

- Ans:**
- |                                    |                                     |
|------------------------------------|-------------------------------------|
| a. Forest (Conservation) Act, 1980 | b. Biological Diversity Act, 2002   |
| c. Wildlife (Protection) Act, 1972 | d. Environment Protection Act, 1986 |

[Students can find out more laws to protect and conserve Biodiversity in India.]

**ii. Environmental effects of ambitious projects like connecting rivers or connecting cities by constructing roads.**

**Ans:** Connecting rivers or connecting cities by constructing roads have the following environmental effects:

- a. They form barriers to animals.
- b. Construction of roads requires cutting down of trees and results in large scale deforestation.
- c. They occupy large land resources resulting in loss of habitat of various species.
- d. It can alter the water flow pattern and damage many ecosystems.
- e. Increase in air, water, soil and noise pollution can disturb various animals and birds, thus affecting their behavioural pattern.

**iii. Did bauxite mining in Western Ghats affect critically endangered species like – Black panther, different *Ceropegia spp.*, *Eriocaulon spp.*?**

**Ans:** It is most likely that bauxite mining in Western Ghats has adversely affected the critically endangered species like – Black panther, different *Ceropegia spp.*, *Eriocaulon spp.* as their numbers have considerably declined in recent times.

[Students are expected to find more information on their own.]

**Q.17. At Andaman, authorities do not allow tourists to collect shells from beaches. Why must it be so?**

[2 Marks]

**Ans:**

- i. Seashells are an important part of the coastal ecosystem and are crucial for the survival of various marine creatures.
- ii. They provide material for building nests of birds and also act as a substratum for attachment of algae, sea grass, sponges and various microbes.
- iii. Fishes use shells for hiding from predators, whereas hermit crabs use shells as temporary shelters.
- iv. Removal of seashells from seashores may also indirectly affect the rate of shoreline erosion.

Hence, in an attempt to protect the ecosystem, authorities in Andaman do not allow tourists to collect shells from beaches.

#### 1.4 Museum

**Q.18. What is a museum? What are the various specimens found in a museum?**

[3 Marks]

**Ans:**

- i. **Museums** are the repositories where collections of preserved plant and animal specimens are kept.
- ii. The different types of specimens found in a museum include;
  - a. Plant and animal specimens preserved in formalin (10% to 40% formaldehyde) in transparent jars.
  - b. Larger animals like birds and mammals, usually stuffed and preserved.
  - c. Certain specimens in dried forms are also exhibited in a museum.
  - d. Systematic collections of shells, skeletons of animals and insect boxes are also found in museums.

**Q.19. What is taxidermy?**

[1 Mark]

**Ans:** Taxidermy is a science in which larger animals like birds and mammals are usually stuffed and preserved.



## 1.5 Zoological Parks

**Q.20. Write a note on zoological park.**

[2 Marks]

**Ans:**

- Zoological park (zoo)** is a place where wild animals are kept in captivity.
- Wild animals are kept in a protected environment and care is taken to provide conditions similar to their natural habitat.
- It is a form of *ex situ* conservation of species i.e. away from their natural habitat.
- A naturalist can study the food habits and behaviour of animals in a zoological park.

**Q.21. Jijamata Udyan, the famous zoo in Mumbai has acclimatised the Humboldt penguins. Why should penguins be acclimatised when kept at a place away from their natural habitat?**

[2 Marks]

**Ans:**

- Zoological park (zoo) is a type of *ex situ* conservation in which wild animals are kept in captivity.
- Humboldt penguins are native to South America and the surrounding environment differs significantly at Jijamata Udyan (zoo) in Mumbai.
- In order to ensure that these penguins survive longer and are healthy they need to be acclimatised (adjust) to their new environment slowly, otherwise they may develop abnormal stress and exhibit unusual behaviours.
- These penguins may also be more prone to contracting certain diseases, since they are suited to living in a particular climatic condition.
- The enclosure of these penguins consists of water pool, air handling units and a chiller system to maintain temperatures between 12 – 14°C, where the penguins were kept for around 8 to 10 days to get acclimatised to their new environment before allowing any visitors inside the zoo.

Hence, Humboldt penguins need to be acclimatised to their new surroundings, when kept at a place away from their natural habitat.

**Q.22. Can you tell? (Textbook page no. 03)**

**Why should we visit botanical gardens, museums and zoo?**

[1 Mark]

**Ans:** Botanical gardens, museums and zoos are taxonomical aids which can be used to study biodiversity.

**Q.23. Explain the different tools used for maintaining biodiversity records.**

[3 Marks]

**Ans:** The different tools used for maintaining biodiversity records are as follows:

- Flora:** It is the plant life occurring in a particular area at a particular time.
- Monograph:** It describes any one selected biological group.
- Manual:** It provides information and keys about identification of species found in a particular area.

## 1.6 Biodiversity Parks

**Q.24. Define biodiversity park.**

[1 Mark]

**Ans:** **Biodiversity park** is an ecological assemblage of species that form self-sustaining communities on degraded/ barren landscape. e.g. Uttamrao Patil Biodiversity Park, Gureghar, Mahabaleshwar.

**Q.25. What do you understand from terms like *in situ* and *ex situ* conservation?**

OR

**Can you tell? (Textbook page no. 03)**

**What is 'ex-situ' and 'in-situ' conservation?**

[2 Marks]

**Ans:**

- In situ conservation:** It includes conservation of species in their natural habitats. Grazing, cultivation and collection of products from the forests is banned in such areas. Legally protected areas include national parks, wildlife sanctuaries and biosphere reserves.
- Ex situ conservation:** It includes conservation of species outside their natural habitats. Species are conserved in botanical gardens, culture collections and zoological parks.

**Q.26. What are sacred groves?**

[1 Mark]

**Ans:** Sacred groves are places where plants are conserved in the name of a holy place.



**\*Q.27. Distinguish between botanical gardens, zoological parks and biodiversity parks with reference to their characteristics. [3 Marks]**

**Ans:**

	Botanical Gardens	Zoological Parks	Biodiversity Parks
i.	Plants of different varieties collected from different parts of the world are grown <i>in vivo</i> in a scientific and systematic manner in a botanical garden.	Zoological parks are places where wild animals are kept in captivity.	It is an assemblage of species that form self-sustaining communities on degraded/ barren landscape.
ii.	It is a type of <i>ex situ</i> conservation.	It is a type of <i>ex situ</i> conservation.	It is a type of <i>in situ</i> conservation.
iii.	It is related to conservation of various flora.	It is related to conservation of various fauna.	It is related to conservation of all biodiversity.

**1.7 Key**

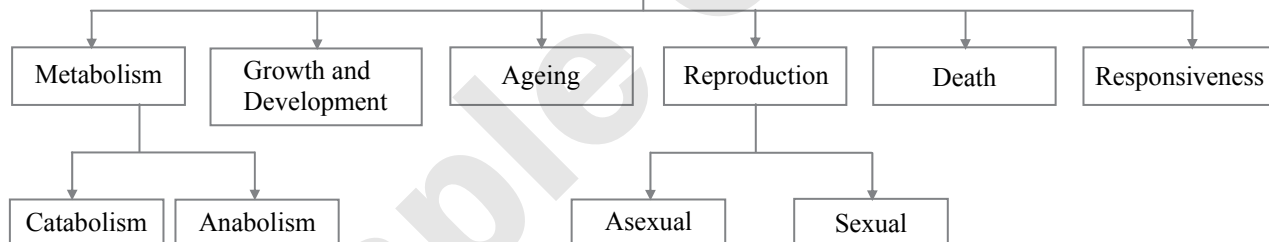
**Q.28. Write a note on ‘key’ used as a taxonomical aid. [2 Marks]**

**Ans:**

- i. Key is a taxonomical aid used in the classification of plants and animals.
- ii. Keys are based on contrasting characters. One of the contrasting characters gets accepted and the other gets rejected.
- iii. The statement in a key is called a lead.
- iv. Normally keys are analytical in nature.

**Quick Review**

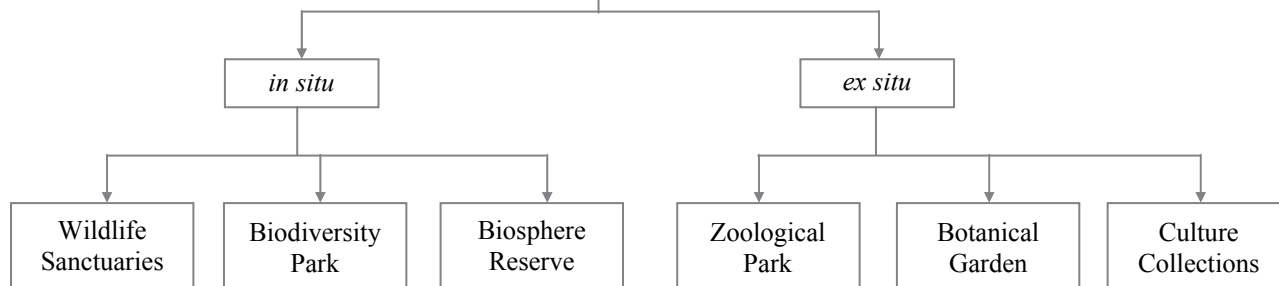
**Basic Principles of Life**

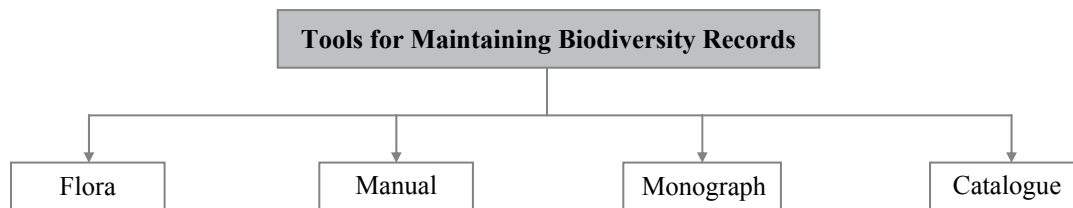


**Taxonomical Aids**



**Conservation of Biodiversity**





## Exercise

### 1.1 Basic Principles of Life

- Define metabolism. **[1 Mark]**  
**Ans:** Refer Q.1. (ii-Reading between the lines - a)
- Enlist the basic principles of life. **[2 Marks]**  
**Ans:** Refer Q.1. (ii)
- Reproduction is not an inclusive character of life. Explain. **[2 Marks]**  
**Ans:** Refer Q.2.

### 1.2 Herbarium

- Define herbarium. **[1 Mark]**
  - Mention any four essentials of a good herbarium. **[2 Marks]****Ans:**
  - Refer Q.5.
  - Refer Q.6. *[Any four points]*
- Shanaya found a unfamiliar plant on her visit to Tamil Nadu. She wants to study the plant thoroughly in her laboratory? How can she do so? **[2 Marks]**  
**Ans:** Refer Q.7.
- Manas wants to prepare a herbarium of plants.
  - What is a herbarium?
  - What are the essentials he should keep in mind to prepare a good herbarium?
  - What information should be added on the label of a herbarium? **[4 Marks]****Ans:**
  - Refer Q.5.
  - Refer Q.6.
  - Refer Q.6. (v)

### 1.3 Botanical Garden

- Can humans help in conservation of biodiversity? Explain your answer. **[2 Marks]**  
**Ans:** Refer Q.14.
- Write a note on botanical gardens. **[3 Marks]**  
**Ans:** Refer Q.8. and 10.
- Botanical gardens are important in botanical studies. Justify. **[3 Marks]**  
**Ans:** Refer Q.10. (i-vi)

- Suggest any three measures you can take to prevent loss of biodiversity. **[3 Marks]**  
**Ans:** Refer Q.15.

- Define biodiversity.
  - How does loss of biodiversity affect the ecosystem? **[3 Marks]**

**Ans:**

- Refer Q.11.
- Refer Q.13.

- Define botanical garden and write a note on importance of greenhouses in botanical gardens. **[3 Marks]**

**Ans:** Refer Q.8 and 9.

### 1.4 Museum

- Which science is used to preserve larger animals at museums? **[1 Mark]**  
**Ans:** Refer Q.19.
- What is a museum? **[1 Mark]**  
**Ans:** Refer Q.18. (i)
- What chemical is used to preserve plant and animal specimens in transparent jars at museums? **[1 Mark]**  
**Ans:** Refer Q.18. (ii-a)

### 1.5 Zoological Park

- Define the following terms: **[1 Mark Each]**
  - Flora
  - Monograph
  - Manual**Ans:** Refer Q.23.

### 1.6 Biodiversity Parks

- Define the following terms: **[1 Mark Each]**
  - Botanical garden
  - Zoological parks
  - Biodiversity parks
  - Museum
  - Herbarium**Ans:**
  - Refer Q.8.
  - Refer Q.20. (i)
  - Refer Q.24.
  - Refer Q.18. (i)
  - Refer Q.5.

### 1.7 Key

- On what characters is the taxonomical aid 'key' based on? **[2 Marks]**  
**Ans:** Refer Q.28.



### Multiple Choice Questions

[1 Mark Each]

- \*1. Which is NOT a property of living beings?  
 (A) Metabolism      (B) Decay  
 (C) Growth          (D) Reproduction
  
2. Which one of the following aspects is an inclusive characteristic of living things?  
 (A) Isolated metabolic reactions occurring *in vitro*  
 (B) Reproduction  
 (C) Irritability  
 (D) Increase in mass by accumulation of material on surface
  
- \*3. A group of students found two cockroaches in the classroom. They had a debate whether they are alive or dead. Which life property will help them to do so?  
 (A) Metabolism      (B) Growth  
 (C) Irritability      (D) Reproduction
  
- \*4. A particular plant is strictly a seasonal plant. Which one of the following is best suited if it is to be studied in the laboratory?  
 (A) Herbarium  
 (B) Museum  
 (C) Botanical garden  
 (D) Flower exhibition
  
5. Herbarium is  
 (A) a collection of living plants which are medicinally important  
 (B) a place where plants collected from different parts of the world are grown  
 (C) a garden where herbs are cultivated  
 (D) a collection of dried and preserved plants
  
6. Which of the following tools provides information for identification of names of species found in a particular area?  
 (A) Catalogues      (B) Manuals  
 (C) Flora            (D) Monographs
  
7. Keys are taxonomical aids that  
 (A) are used to identify plants and animals based on similarities and dissimilarities.  
 (B) contains the account of habitat and distribution of plants in a given area.  
 (C) provides an index to the plant species found in a particular area.  
 (D) provide information for identification of species found in an area.

### Answers to Multiple Choice Questions

1. (B)    2. (C)    3. (C)    4. (A)  
 5. (D)    6. (B)    7. (A)



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- Book-Keeping & Accountancy Solutions To Textbook Problems
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- Secretarial Practice
- Mathematics and Statistics - I
- Mathematics and Statistics - II

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