SAMPLE CONTENT

Challenger

BIOLOGY Vol - I

NEET - UG

Now with more study techniques

3427 MCQs with Hints

For all Medical Entrance Examinations held across India.

Target Publications® Pvt. Ltd.

For all Medical Entrance Examinations held across India.

Challenger

NEET – UG

Biology Vol. I

Now with more study techniques

Salient Features

- Concise theory for every topic.
- Exhaustive coverage of MCQs under each sub-topic.
- '3427' MCQs including questions from previous NEET examinations.
- Includes selective solved MCQs upto NEET Phase I and II 2020
- Includes NEET-Phase II 2020 Question Paper and Answer Key along with Hints.
- Multiple Study Techniques to Enhance Understanding and Problem Solving.
- Important inclusions Problems to Ponder.
- Hints provided wherever deemed necessary.

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PREFACE

'Challenger Biology Vol - I' is a compact guidebook, extremely handy for preparation of NEET-UG exam. This edition provides an unmatched comprehensive amalgamation of theory with MCQs. The chapters are completely based on syllabus prescribed for the NEET. The book provides the students with scientifically accurate context and relevant supporting details essential for a better understanding of biology.

In this book the Theoretical Concepts are presented in the form of pointers, tables, charts and diagrams which form a vital part of preparation any competitive examination.

Multiple Choice Questions have been specially created and compiled with the following objective in mind – to help students solve complex problems which require strenuous effort and understanding of multiple concepts. The assortment of MCQs is a beautiful blend of questions based on higher order thinking, theory, and multiple concepts.

MCQs in each chapter are segregated into following sections.

- **Concept Building Problems:** Contains questions of various difficulty range and pattern.
- **Practice Problems**: Contains ample questions for thorough revision. The quality of questions challenges students to apply their scientific knowledge and skills to interpret data while solving the questions.
- **Problems to Ponder**: MCQs of different pattern created with the primary objective of helping students to understand the application of various concepts of Biology.

All the features of this book pave the path of a student to excel in examination. The features are designed keeping the following elements in mind: Time management, easy memorization or revision and non-conventional yet simple methods for MCQ solving.

To keep students updated, selected questions from most recent examinations of NEET 2020 are covered exclusively.

NEET-UG 2020 (Phase II) Question Paper and Answer Key has been provided so that students can get a glimpse of the complexity of questions asked in entrance examination. The paper has been split unit-wise to let the students know which of the units were more relevant in the latest examination.

We hope that this book serves as exceptional tutor for student!

A book affects eternity; one can never tell where its influence stops.

From,
Publisher

Edition: Fourth

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

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FEATURES

Concise Theory

Taxonomical aids

Herbarium

- Storehouse of plant specimens.
- Plants collected → dried → pressed → preserved on sheets → sheets are arranged according to universally accepted system of classification → store house/repository /herbarium.

Botanical Gardens

- Collection of living plants for reference.
- Some of the famous botanical gardens are: Kew (England), Indian Botanical Garden (Howrah-India), National Botanical Research Institute (Lucknow-India)

Concise theory

'Theoretical Concepts' are presented in the form of point s, tables, charts and diagram that form a vital part of any compet ve examination.

Smart tip

'Smart tip' can be used to memorise or revise the key points and formulae at a glance.

Sma tip - 1

Light reaction (Photochemical phase) → Occurs in thy koid membrane → Synthesis of ATP and NADPH

ark eaction (Biochemical phase) → Occurs in stroma → U e ATP and NADPH for CO_2 fixation

Thinkin , Hat - Q.)

On ing *Sm t tip* it is clear that during mitosis, d ughte d parent cells have same chromosome numbers (i - c) nd this combination is observed in c tio (C). T refore, the probability of having answers rom the options is eliminated.

Thinking Hatke

'Thinking Hatke' section provides the students with the added benefit of looking at questions in a completely new way and identifying the tricks to arrive at the correct answer in a more non-conventional yet simple way.

Caution

'Caution' helps students to clarify the difference between two related words or homophones.

CAUTION

Arteries carry oxygenated blood except pulmonary arteries as they carry deoxygenated blood towards lungs. Veins carry deoxygenated blood except pulmonary veins as they carry oxygenated blood towards heart.

FEATURES

SMART CODE - 2

Types of vertebrae and their number in each region of vertebral column:

Crunchy breakfast at **7**am, **T**asty lunch at **12**pm, **L**ight dinner at **5**pm, then **S**leep - **C**ozy at **1**am.

C 7 – Cervical (7), T 12 – Thoracic (12), L 5 – Lumbar (5), S 1 – Sacral (1), C 1 – Coccyx (1)

Smart Code

'Smart code' provides simplified mnemonics for important or difficult concepts.

Knowledge Badhao

'Knowledge Badhao' provide students with key information that may be required to understand a concept fully, but is not a part of NCERT textbook.

Knowledge Badhao!

Neutral amino acids:
Glycine, Alanine, Cystein[illegible] Threo[illegible]ne, Leucine, Tryptophan, Valine, Met[illegible]nine, [illegible]sparagine, Glutamine, Isoleucine, Phenylalan[illegible]e, Pro[illegible]e, S[illegible]ne, Tyrosine

Sulphur co[illegible]ing a[illegible]ino acid:
Cysteine and Methionine

Q.R. Codes

Students are expected to refer the gi[illegible] Q.R. code for additional information [illegible] the Deficiency Symptoms of Eleme[illegible]

'Q.R. code' provides access to a video/PDF in order to boost understanding of a concept or activity.

Quick Review

'Quick Review' includ[illegible] tab[illegible]s/ flow charts to [illegible]marize [illegible]e key points in ch[illegible]ter.
This is o[illegible] attem[illegible] to help stud[illegible] to reinforce key co[illegible]cepts

Plant tissues

Meristematic tissue
Have the power of cell division.

Classification based on position:
a. Apical
b. Intercalary
c. Lateral

Permanent tissues
Have lost the power of cell division

Simple
Made up of similar type of cells
i. Parenchyma
ii. Collenchyma
iii. Sclerenchyma
   a. Fibres
   b. Sclereids

Complex
Made up of different types of cells
i. Xylem (transport water and minerals)
   a. Tracheids
   b. Vessels
   c. Xylem sclerenchyma
   d. Xylem parenchyma

FEATURES

2.0 Introduction

1. The drawback/s or limitation/s of two kingdom classification is/are
   (A) photosynthetic and non-photosynthetic organisms are placed together.
   (B) that it cannot distinguish between unicellular and multicellular organisms.
   (C) that it cannot distinguish between eukaryotes and prokaryotes.
   (D) all of the above

Subtopic wise flow of MCQs

Questions are segregated based on flow of subtopics given in each chapter as per NCERT textbook.

Questions from previous NEET exams:

To ensure students are well prepared, important questions from previous NEET exams are covered exclusively.

6. Which one of the followi[illegible]s CORR[illegible]CT? **[2015]**
   (A) Plasma = Blood [illegible] Lym[illegible]ocytes
   (B) Serum = Bl[illegible]od + f[illegible]rinog[illegible]n
   (C) Lymph = I[illegible]sma + R[illegible]C + WBC
   (D) [illegible]lood = Pla[illegible]a + RP[illegible] + WBC + Platelets

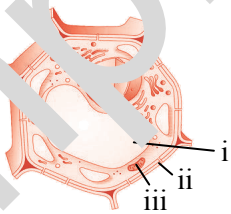
6. (D)

6. Re[illegible]r ***Smart tip -***
Blo[illegible]d plasma co[illegible]ains red blood cells, white blood cells ([illegible]mphocy[illegible]s) and platelets.
Serum = [illegible]lood plasma – Clotting factors Lymph does not normally contain any red blood cells.

Diagram based questions

Diagram based questions contain questions that facilitate students' conceptual understanding and enhance their special thinking ability.

2. In the diagram of plant cell g[illegible]n below, identify (i), (ii) and (iii).



(A) i – Vacuole, ii – Cell wall, iii – Mitochondrion
(B) i – Vacuole, ii – Cytoplasm, iii – Mitochondrion
(C) i – Nucleus, ii – Cell wall, iii – Mitochondrion
(D) i – Nucleus, ii – Cell wall, iii – Chloroplast

2. (A)

Thinking Hatke - Q. 2

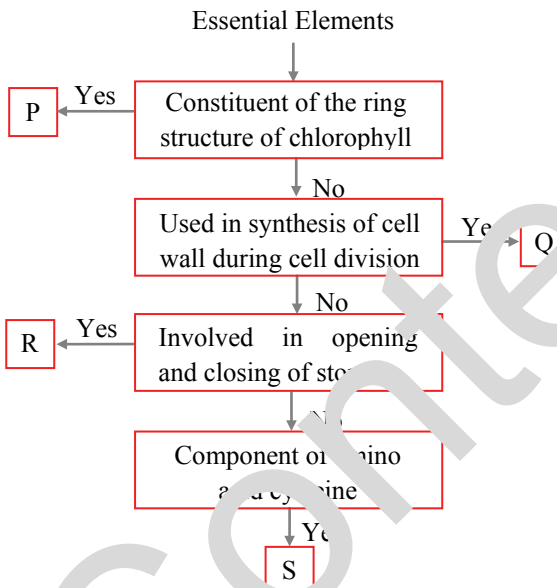
Large vacuoles (i) are present in plant cell. Therefore, possibilities of option C and D are eliminated. Since, it is a plant cell, cell wall will be the outermost layer of the cell (ii). This eliminates option B. Thus, option A is correct.

FEATURES

Problems to Ponder

MCQs of different pattern are created with the primary objective of helping students to understand the application of various concepts of Biology.

Problems To Ponder



	P	Q	R	S
(A)	Mn	Mg	P	N
(B)	M	Ca	K	S
(C)	S	N	Fe	Cl
(D)	N	Cu	K	Mn

Frequently Asked Questions

➢ Why Challenger Series?

Gradually, every year the nature of competitive entrance exams is inching towards conceptual understanding of topics. Moreover, it is time to bid adieu to the stereotypical approach of solving a problem using a single conventional method.

To be able to successfully crack the NEET examination, it is imperative to develop skills such as data interpretation, appropriate time management, knowing various methods to solve a problem, etc. With Challenger Series, we are sure, you'd develop all the aforementioned skills and take a more holistic approach towards problem solving. The way you'd tackle advanced level MCQs with the help of hints, Smart tips, Smart codes and Thinking Hatke section would give you the necessary practice that would be a game changer in your preparation for the competitive entrance examinations.

➢ What is the intention behind the launch of Challenger Series

The sole objective behind the introduction of Challenger Series is to severely test the student's preparedness to take competitive entrance examinations. With an eclectic range of critical and advanced level MCQs, we intend to test a student's MCQ solving skills within a stipulated time period.

➢ What do I gain out of Challenger Series?

After using Challenger Series, students would be able to:

a. assimilate the given data and apply relevant concepts with utmost ease.

b. tackle MCQs of different pattern such as match the columns, diagram based questions, multiple concepts and assertion-reason efficiently.

c. garner the much needed confidence to appear for competitive exams.

d. easy and time saving methods to tackle tricky questions will help ensure that time consuming questions do not occupy more time than you can allot per question.

➢ Can the Questions presented in Problems to Ponder section be a part of the NEET Examination?

No, the questions would not appear as it is in the NEET Examination. However, there are chances that these questions could be covered in parts or with a novel question construction.

Best of luck to all the aspirants!

CONTENTS

[illegible]ote: symbol along with the question indicates there exists either an unconventional way or use of either Smart tip / Thinking hatke / Smart Code / any other short ways of solving that MCQ.

1 The Living World

1.1 What is Living?

Living organisms are self-replicating, self-regulating, constantly evolving, highly interactive systems capable of responding to stimulus.

CHARACTERISTICS OF LIVING ORGANISMS

Growth:
i. All living organisms grow. This growth is intrinsic (from inside).
ii. Twin characteristics of growth: Increase in mass and number of individual
iii. Growth by cell division occurs in both multicellular and unicellular organisms.
iv. Plants – Growth by cell division occurs continuously throughout the life span.
Animals – Growth by cell division occurs up to certain age.
v. In non-living objects growth is exhibited by accumulation of material on the surface.
vi. Mountains, boulders and sand mounds do grow.

Reproduction:
i. A process by which multicellular organisms produce progeny that possess features similar to parents (Sexual Reproduction).
ii. Reproduction by spreading asexual spores - Fungi.
iii. Budding - Yeast and *Hydra*.
iv. True regeneration - *Planaria*
v. Fragmentation - Fungi, filamentous algae, the protonemma of mosses.
vi. Reproduction is synonymous with growth i.e. increase in number of cells in unicellular organisms like bacteria, algae, *Amoeba*.
vii. Cannot Reproduce - Mules, sterile worker bees, infertile human couples and non-living objects.

Metabolism:
i. All living organisms are made up of chemicals.
ii. Chemicals belong to various classes and sizes etc. and are constantly being made and changed into some other biomolecule.
iii. These conversions are called chemical or metabolic reactions.
iv. All plants, animals, fungi and microbes exhibit metabolism.
v. Non-living objects do not exhibit metabolism.
vi. Metabolic reactions carried out *in vitro* are living reactions.

Cellular Organization:
Metabolism occurs inside the cells. All living organisms have some or the other cell organelles like nucleus, cytoplasm, etc. that make up the cell.

Consciousness:
i. It is the most complicated feature of all living organism.
ii. With the help of sense organs, humans sense the environment. Human being is the only organism who has self-consciousness.
iii. Plant responds to external factors like light, water, temperature, other organisms and pollutants, etc.
iv. From prokaryotes to eukaryotes all respond to environmental stimuli.
v. Photoperiod affects reproduction in plants as well as in animals.

CAUTION

Consciousness is the state of being aware and responsive to one's own surroundings. All living organisms exhibit consciousness.
Self-consciousness is the state of being aware of not only the surroundings, but also of themselves, their activities, their bodies and mental lives. Only human beings exhibit self-consciousness.

Smart tip - 1

Characteristics of life can be categorized into two:
i. **Defining properties**: Metabolism, cellular organization, consciousness.
ii. **Non-defining properties**: Reproduction, growth.

1.2 Diversity in the Living World Theory

- **Biodiversity:** The number and types of organisms present on Earth.
- **Identification:**
  Identification is finding the correct name and place of an organism in a system of classification with the help of identification key. It also includes comparing an organism with similarities and dissimilarities of already known organism.
- **Nomenclature:** It provides a distinct and proper name to an organism.
  Scientific names are based on certain principles provided by taxonomists:

i. For plants, International Code for Botanical Nomenclature (ICBN).
ii. For animals, International Code for Zoological Nomenclature (ICZN).

Binomial Nomenclature: Naming system given by Carolus Linnaeus.

Rules of Binomial Nomenclature:

i. Biological names are generally in Latin and written in Italics.
ii. Each name has two components - Generic name and the specific epithet (species name).
e.g. *Mangifera indica*
iii. Scientific names when handwritten are separately underlined or printed in italics to indicate their Latin origin.
iv. In scientific name, first word denotes the genus which starts with capital letter, while the second word denotes specific epithet which starts with small letter.
v. Author's name appears after specific epithet and is written in an abbreviated form. e.g. *Mangifera indica* Linn.

- **Classification:** It is the process by which an organism is grouped into convenient categories based on observable characters.
- **Taxonomy:**

i. It is the process of classification of all living organisms into different taxa based on their characteristics.
ii. Any organism is grouped into convenient categories based on some easily observable characteristics. The scientific term for these categories is **taxa**.
iii. Characterisation, identification, classification and nomenclature are the processes that are basic to taxonomy.

- **Systematics:** It is the study of evolutionary relationships among different kinds of organisms and their diversities. "Systema Naturae" was the name aptly given by Linnaeus as the title of his publication.

1.3 Taxonomic Categories

- **Taxonomic Category:** It is a rank or level in the hierarchical classification of organism. It is a part of overall taxonomic arrangement and is hence called taxonomic category. All categories together constitute the taxonomic hierarchy.
- **Taxon:** It represents a unit of classification. Taxon represents definite position in various categories.

Smart tip - 2

Taxonomic Categories showing hierarchical arrangement (descending order) order /
Similarities between organisms increase in this order:
KINGDOM → PHYLUM → CLASS → ORDER→ FAMILY → GENUS → SPECIES

- **Species:** It is a group of individual organisms with fundamental similarities.
  tuberosum – Potato (*Solanum tuberosum*)
  leo – Lion (*Panthera leo*)
  tigris – tiger (*Panthera tigris*)
  In the given examples, *Solanum* and *Panthera* are genus while *tuberosum*, *leo*, *tigris* are species.
  Genus *Solanum* also have species like *nigrum* (*Solanum nigrum* – Black night shade) and *melongena* (*Solanum melongena* – *Eggplant*)
  In *Mangifera indica* (Mango), *Mangifera* is genus, *indica* is species.

- **Genus:** Closely related species are called genus.

Genus	Species
Solanum	*melogena* (brinjal)
	Tuberosum (potato)
Panthera	*leo* (Lion)
	pardus (Leopard)
	tigris (Tiger)

- **Family:** It is a group of closely related g

Family	Genus
Solanaceae	*Solanum*
	Petunia
	Datura
Felidae	*Panthera*
	Felis

- **Order:** It is a group of closely related families.

Order	Family
Polymoniales	Convolvulaceae
	Solanaceae

Order	Family
Carnivo	lidae
	Canidae

***[Note:** The Solanales are an order of flowering plants incl ing plant fa lies lik Convolvulacea and Solanaceae. Some older sources used the name Polemoniales for this der.]*

Smart tip - 3

Name of the family usually ends with "idae" in animals and "aceae" in plants.

- **Class:** It includes related orders.

Class	Order
Mammalia	Primata
	Carni ora

- **Phylum:** It is composed of related classes.
  Chordata have common features of presence of notochord and dorsal hollow neural system.

Phylum	Class
Chordata	Pisces (fishes)
	Amphibia (amphibian)
	Reptilia (reptiles)
	Mammalia (mammals)

CAUTION

In ca e of ts, classes with similar characters are assigned to higher category called **Division**. It is equiv ler to **P m**.

- **ngdom:** Highest taxonomic category.

K gdom		Phylum		Class		Order		Family		Genus		Species
A mmalia	→	Chordata	→	Mammalia	→	Carnivora	→	Felidae	→	*Panthera*	→	*leo*

SMART CODE - 1

Taxonomic Categories

Kids **P**refer **C**andy **O**ver **F**ried **G**reen **S**pinach

K – **K**ingdom, **P** – **P**hylum, **C** – **C**lass, **O** – **O**rder, **F** – **F**amily, **G** – **G**enus, **S** – **S**pecies

➢ **Organisms with their Taxonomic Categories**

Common Name	Biological Name	Genus	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	*Homo*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	*Musca*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	*Mangifera*	Anacardiaceae	Sapindales	Dicotyledonae	Angiosperm
Wheat	*Triticum aestivum*	*Triticum*	Poaceae	Poales	Monocotyledonae	Angiospermae

1.4 Taxonomical Aids

Taxonomical aids

Herbarium

- Storehouse of plant specimens.
- Plants collected → dried → pressed → preserved on sheets → sheets are arranged according to universally accepted system of classification → store house/repository /herbarium.
- It contains information about date and place of collection; English, local and botanical names; family; collector's name; etc.

Botanical Gardens

- Collection of living plants for reference.
- Some of the famous botanical gardens are: Kew (England), Indian Botanical Garden (Howrah-India), National Botanical Research Institute (Lucknow-India)

Museum

- Collection of preserved plant and animal specimens for study and reference.
- Specimens are preserved in jars or containers with preservative solutions.
- Insects are preserved in insect boxes.
- Large animals are stuffed and preserved.

Keys

- It is used for identification of plants and animals based on the similarities and dissimilarities.
- Single pair of contradictory statements of a key is called couplet. Each statement of couplet is numbered lead.
- It is analytical in nature, because choice is made between two opposite options in which one is selected and other one is rejected.
- Analytical in nature

Zoological Parks

- Wild animals kept in protected environment.
- It is a repository for threatened wild life.
- It is *ex situ* conservation.

Recording Descriptions

Flora

- Contains actual account of habitat and distribution of plants in given area.
- Provide index to the plant species.

Manuals

- Provide information for identification of names of species found in an area.

Monographs

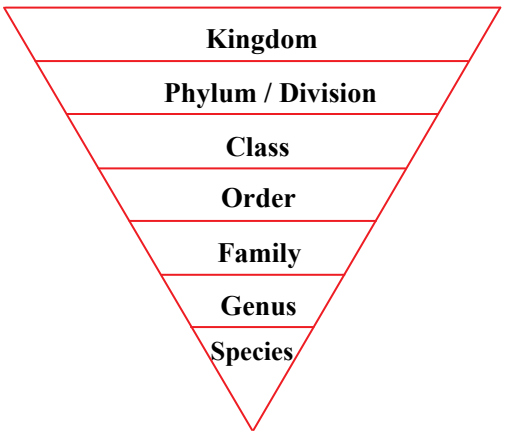
- Provide information on any one taxon.
- Comprehensive data of taxonomic group

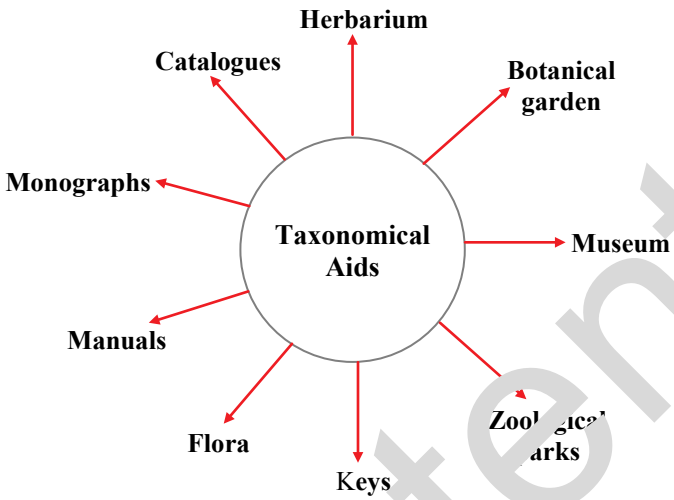
Catalogues

- A list that enumerates methodically all the species found in an area with brief description aiding identification

Students are expected to refer the given Q.R. code for additional information on the keys.

Quick Review





Concept Building Problems

1.1 What is Living?

1. The property shown by both living and non-living things is
   (A) growth
   (B) consciousness
   (C) reproduction
   (D) cellular organization

2. Twin characteristics of growth are
   (A) increase in length and width
   (B) increase in width and number
   (C) increase in mass and number
   (D) increase in size and mas

3. Which of the following statement [illegible] TRU
   (A) In both mango plant [illegible] frog, growth by cell division occurs continu sly.
   (B) In Banyan tree, c division ccurs up to a certain age where in d g, it occurs continuous y.
   (C) In Tul ant, gr th b cell division occur cont uously whereas in snakes, it occ only up a certain age.
   (D) In both otato plant and octopus, growth by ell di ion occurs only upto a certain a e.

4. Mat col nn I and II and select the correct tion.

	Column I		Column II
i.	ngi	a.	Budding
	Amoeba	b.	True regeneration
iii.	*Hydra* and Yeast	c.	Asexual Spores
iv.	*Planaria*	d.	Binary fission

   (A) i – a, ii – b, iii – c, iv – d
   (B) i – c, ii – d, iii – a, iv – b
   (C) i – b, ii – a, iii – d, iv – c
   (D) i – d, ii – b, iii – a, iv – c

5. Reproduction is [illegible] vmou [illegible] growth in
   (A) Bacteri (B) *Amoeba*
   (C) Unicellu algae (D) All of the above

6. Find [illegible] ODD one out based on the char teristics f liv g organisms.
   (A) Mules
   (B) *ibiscu*
   (C) Ste worker bees
   (D) nfertile human couples

7. Whi of the following statements represents th defining property of living organisms?
   (A) Worker bees are sterile.
   (B) Plants respond to external factors such as light, temperature, water etc.
   (C) Sand mounds grow due to accumulation of matter from outside.
   (D) All the above

8. Which of the following is INCORRECT regarding asexual reproduction?
   (A) *Spirogyra* reproduces asexually by fragmentation.
   (B) In *Amoeba*, reproduction is synonymous to growth.
   (C) *Planaria* regenerates the lost part of the body and becomes a new organism.
   (D) Mules can reproduce upto a certain age and then become sterile.

9. Which of the following statements is INCORRECT?
   (A) Mountains, boulders and sand mounds do grow if we take increase in body mass as criterion for growth.
   (B) Many organisms like mules, sterile worker bees and infertile human couples do not reproduce at all.
   (C) Living organisms are self-replicating, evolving and self-regulating interactive systems capable of responding to external stimuli.
   (D) Isolated metabolic reactions *in vitro* are living things.

10. Study the four statements (i - iv) given below and select the two correct ones out of them.
    i. Definition of biological species was given by Ernst Mayr.
    ii. Photoperiod does not affect reproduction in plants.
    iii. Binomial nomenclature system was given by R. H. Whittaker.
    iv. In unicellular organisms, reproduction is synonymous with growth.

    [Phase II 2016]

    The two correct statements are
    (A) i and ii (B) ii and iii
    (C) iii and iv (D) i and iv

1.2 Diversity in the Living World

1. Read the following statements and opt for the appropriate conclusion.
   Statement I: Nomenclature is a process wherein standardization of the names of living organisms is done.
   Statement II: Nomenclature helps in identification of organisms, thus after naming, organisms can be described correctly.
   (A) Statement I is correct
   (B) Statement II is correct.
   (C) Both the statements are correct.
   (D) Both the statements are incorrect.

2. Need for a proper system of classification arises because
   (A) the organisms of the past cannot be studied without it.
   (B) classification helps in knowing the relationships among the different groups of organisms.
   (C) it is not possible to study all the living organisms.
   (D) all of these

3. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature? **[Phase I 2016]**
   (A) The names are written in Latin and are italicised.
   (B) When written by hand, the names are to be underlined.
   (C) Biological names can be written in any language.
   (D) The first word in a biological name represents the genus name, and the second is a specific epithet.

4. Which of the following is against the rules of ICBN? **[Odisha 2019]**
   (A) Generic and specific names should be written starting with small letters.
   (B) Hand written scientific names should be underlined.
   (C) Every species should have a generic name and a specific epithet.
   (D) Scientific names are in Latin and should be italized.

5. According to the binomial nomenclature system, name of the author appears _____.
   (A) before the specific epithet
   (B) after the specific epithet
   (C) before the generic name
   (D) after the generic name

6. Opt for the appropriate way of writing biological name from below.
   (A) *Solanum tuberosum*
   (B) Panthera leo
   (C) *Mangifera Indi*
   (D) *solanum nigrum*

7. Which one is the mismatched pair?
   (A) Wheat – *Triticum aestivum*
   (B) Housefly – *Musca domestica*
   (C) Mango – *Homo sapiens*
   (D) Lion – *Panthera leo*

8. A taxon can be defined as
   (A) a group of related species
   (B) a group of related genera
   (C) a group of any one rank or organisms
   (D) a group of organisms having similar number of chromosomes

9. Branch of study of different kinds of organisms, their diversities and also their interactions is referred as _____.
   (A) classification (B) nomenclature
   (C) hierarchy (D) systematics

10. Systematics includes
    (A) only nomenclature
    (B) identification, nomenclature and classification
    (C) anatomical characters and classification
    (D) identification and nomenclature only

1.3 Taxonomic Categories

1. The serial arrangement of taxon is known as
   (A) Category (B) Classification
   (C) Hierarchy (D) Taxonomy

2. Taxonomic hierarchy is
   (A) a list of botanists or zoologist who have worked on taxonomy in ICBN and ICZN respectively.
   (B) a group of senior taxonomists who decide the nomenclature of plants and animals.
   (C) stepwise arrangement of all categories for classification of plants and animals.
   (D) classification of a species based on fossil record.

3. The correct sequence of taxonomic hierarchy is
(A) Genus → Family → Class → Order → Phylum → Kingdom → Species
(B) Species → Genus → Family → Order → Class → Phylum → Kingdom
(C) Species → Family → Genus → Kingdom → Order → Class → Phylum
(D) Species → Genus → Family → Class → Order → Phylum → Kingdom

4. *Musca* and *pardus* are _____ respectively.
(A) genus and species
(B) genus and genus
(C) species and genus
(D) species and species

5. Genus *Solanum* includes

i.	Potato	ii.	Brinjal
iii.	Datura	iv.	*Petunia*
(A)	i, iii	(B)	i, ii
(C)	i, iv	(D)	i, ii, iii

6. Read the following statements and choose the correct option.
Statement I: Genus includes more than one specific epithets that represent different organisms with least morphological differences.
Statement II: Genus *Solanum* includes species like *melongena* and *nigrum*.
(A) Statement I is correct.
(B) Statement II is correct.
(C) Both Statements I and II are correct.
(D) Both Statements I and II are incorrect.

7. The name of a plant family ends with
(A) –ales (B) –ideae
(C) –aceae (D) None of these

8. Match the column I and II select the correct option.

	Column I		Column II
i.	Man	a.	Poaceae
ii.	*Datura*	b.	Anthocerdiaceae
iii.	Mango	c.	Solanaceae
iv.	Wheat	d.	Hominidae

(A) i – d, ii – c, iii – b, iv – a
(B) i – c, ii – d, iii – a, iv – b
(C) i – a, ii – d, iii – c, iii – b, iv – d
(D) i – a, ii – c, iii – d, iv – b

9. Match the column I and II select the correct option.

	Column I		Column II
i.	Wheat	a.	Primata
ii.	Mango	b.	Diptera
iii.	Housefly	c.	Sapindales
iv.	Man	d.	Poales

(A) i – a, ii – b, iii – d, iv – c
(B) i – d, ii – c, iii – b, iv – a
(C) i – b, ii – d, iii – a, iv – c
(D) i – d, ii – b, iii – c, iv – a

10. Families like Solanaceae and Convolvulaceae are included in the same order mainly based on
(A) Vegetative characters
(B) Morphological characters
(C) Floral characters
(D) Both (A) and (B)

11. Identify the 'Order' from the following.
(A) Primata (B) Muscidae
(C) Insecta (D) Panthera

12. Which taxonomic category of wheat is WRONGLY matched?
(A) Genus - *Triticum*
(B) Family- Poaceae
(C) Order- Sapindales
(D) Class- Monocotyledonae

13. Which of the following taxonomic categories do Diptera and Carnivora belong?
(A) Order (B) Divisions
(C) Family (D) Class

14. Find the ODD one out.
(A) Primata (B) Diptera
(C) Sapindales (D) Poaceae

15. Which of the following statement/s is / are TRUE?
i. Growth cannot be taken as a defining property of living organisms.
ii. *Panthera Pardus* is a scientific name of Leopard in which *Panthera* is printed incorrectly.
iii. In binomial nomenclature, biological names are derived from Latin irrespective of their origin.
iv. In plants, orders with few similar characters are assigned to Division.
(A) All are true
(B) Only (i) and (iii) are true
(C) Only (i) and (iv) are true
(D) Only (ii) and (iii) are true

16. Two organisms are from the same phylum, but different Order. They may belong to the same
(A) Species (B) Class
(C) Genus (D) Family

17. Match the following.

	List - I		List - II
i.	Order	a.	*nigrum*
ii.	Species	b.	Polymoniales
iii.	Family	c.	*Solanum*
iv.	Class	d.	Solanaceae
		e.	Dicotyledonae

The correct answer is
(A) i – b, ii – a, iii – c, iv – e
(B) i – c, ii – e, iii – d, iv – b
(C) i – b, ii – a, iii – d, iv – e
(D) i – a, ii – c, iii – e, iv – b

18. Which one of the following group consists of organisms with least similar characters?
(A) Species (B) Genus
(C) Family (D) Class

19. Match Column-I with Column-II for housefly classification and select the correct option using the codes given below:

	Column I		Column II
i.	Family	a.	Diptera
ii.	Order	b.	Arthropoda
iii.	Class	c.	Muscidae
iv.	Phylum	d.	Insecta

[Phase II 2016]
(A) i – d, ii – b, iii – a, iv – c
(B) i – c, ii – a, iii – d, iv – b
(C) i – c, ii – b, iii – d, iv – c
(D) i – d, ii – c, iii – b, iv – a

20. In the process of classification of animals, the taxonomic unit 'Phylum' is equivalent to which hierarchical level in classification of plants?
(A) Class (B) Order
(C) Division (D) Family

21. Which of the following is NOT a taxon but category?
(A) Division
(B) Dicotyledons
(C) Angiosperms
(D) Monocotyledonae

22. In the system of classification which one of the following is NOT a category?
(A) Kingdom (B) Species
(C) Angiospermae (D) Genus

23. A connecting link between kingdom and class in plant hierarchy is
(A) family (B) division
(C) phylum (D) order

24. Which of the following taxon has least number of similar characters
(A) Order (B) Family
(C) Division (D) Class

25. _____ covers the largest number of organisms.
(A) Genus (B) Kingdom
(C) Phylum (D) Family

26. Fishes, amphibians, reptiles, birds and mammals are included in the same category, called
(A) Division (B) Phylum
(C) Order (D) Class

27. Complete the analogy.
Man : *Homo sapiens* :: _____ : *Triticum aestivum.*
(A) Housefly (B) Mango
(C) Wheat (D) Potato

28. Identify the correct sequence of taxonomic hierarchical arrangement in ascending order of the following.
(A) Monocotyledonae, Poaceae, Angiospermae, *Triticum,* Poales.
(B) *Triticum,* Poaceae, Poales, Monocotyledonae, Angispermae.
(C) *Triticum,* Monocotyledonae, Poaceae, Poales, Angiospermae.
(D) Poales, Poaceae, Monocotyledonae, Angiospermae.

29. Which of the following is correctly matched without exception in regard to plant classification?

(A)	Family	Poaceae
(B)	Division	Monocotyledonae
(C)	Class	Angiospermae
(D)	Genus	*Indica*

1.4 TAXONOMICAL AIDS

1. Which one of the following is NOT a correct statement?
(A) Key is a taxonomic aid for identification of specimens.
(B) A museum has collection of photographs of plants and animals.
(C) Botanical gardens have collection of living plants for reference.
(D) Herbarium houses dried, pressed and preserved plant specimens.

2. If a student wants information on any one taxon, he should refer
(A) herbarium (B) manuals
(C) flora (D) monographs

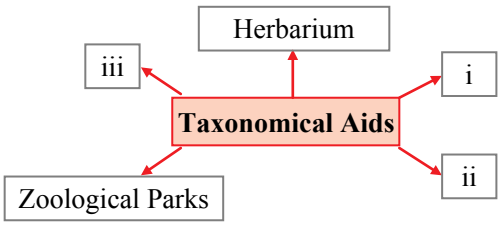
3. The label of a herbarium sheet does not carry information on [Phase II 2016]
(A) height of the plant
(B) date of collection
(C) name of collector
(D) local names

4. Kew, London is famous for
(A) being the largest biological reserve
(B) the zoological park
(C) being the largest botanical garden
(D) diverse flora and fauna

5. A zoological garden has all of the following characteristics, except
(A) wild animals are under human care.
(B) wild animals are provided conditions similar to their natural habitat.
(C) it enables us to understand the skeletons and integumentary systems of wild animals.
(D) it enables us to know about the food habits and behaviour of wild animals.

6. Read the following statements and select the correct option.
Statement I: Key is analytical in nature.
Statement II: Each statement in the key is called as couplet.
(A) Statement I is correct.
(B) Statement II is correct.
(C) Both Statements I and II are correct.
(D) Both Statements I and II are incorrect.

7. Fill in the blanks according to taxonomical aids.



(A) i – Flora, ii – Kingdom, iii – Botanical gardens
(B) i – Catalogues, ii – Keys, iii – Species
(C) i – Botanical garden, ii – Museum, iii – Keys
(D) i – Monographs, ii – Order, iii – Manuals

8. Which of the following is useful in providing information for identification of names of species found in an area?
(A) Catalogues (B) Manuals
(C) Monographs (D) Flora

9. A taxonomical aid which is based on contrasting character and used for identification of both plants and animals is
(A) Keys (B) Manuals
(C) Monographs (D) Flora

10. Which of the following statements about taxonomical aids is/are TRUE?
i. Keys are used to identify plants and animals based on similarities and dissimilarities.
ii. Flora contains the account of habitat and distribution of plants in a given area.
iii. Flora provides an index to the plant species found in a particular area.
iv. Monographs provide information for identification of species found in an area.
(A) i and ii (B) i, ii and iii
(C) ii and iv (D) i only

11. Which of the following taxonomical aid serve as a quick referral system in taxonomical studies?
(A) Key (B) Botanical gardens
(C) Herbaria (D) Museum

12. Match the columns and select the correct option.

	Column I		Column II
i.	Carolus Linnaeus	a.	Chordata
ii.	*Homo sapiens*	b.	Index
iii.	Flora	c.	*Planaria*
iv.	Regeneration	d.	*Amoeba*
		e.	Systema Naturae

(A) i – b, ii – e, iii – a, iv – d
(B) i – e, ii – d, iii – b, iv – c
(C) i – b, ii – c, iii – a, iv – d
(D) i – e, ii – a, iii – b, iv – c

13. Match the items given in Column I with those in Column II and select the correct option given below:

	Column I		Column II
i.	Herbarium	a.	It is a place having a collection of preserved plants and animals
ii.	Key	b.	A list that enumerates methodically all the species found in an area with brief description aiding identification
iii.	Museum	c.	It is place where dried and pressed plant specimens mounted on sheets are kept
iv.	Catalogue	d.	A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

[2018]

(A) i – b, ii – d, iii – c , iv – a
(B) i – c, ii – b, iii – a , iv – d
(C) i – a, ii – d, iii – c , iv – b
(D) i – c, ii – d, iii – a , iv – b

Practice Problems

1.1 What is Living?

1. **Statement I:** Growth in unicellular organisms can be observed easily in *in vitro* cultures by simply counting the number of cells under microscope.
Statement II: Isolated metabolic reactions *in vitro* cannot be considered as living reactions because no living things are involved.
(A) Statement I is correct.
(B) Statement II is correct.
(C) Both Statements I and II are correct.
(D) Both Statements I and II are incorrect.

2. Which of the following statement is CORRECT?
(A) In Prokaryotes, consciousness cannot be the defining property of living organisms.
(B) In seasonal breeders, photoperiod affect reproduction. Thus, they show property of consciousness.
(C) Human beings and some other mammals have self-consciousness.
(D) All organisms can handle chemicals entering their bodies except plants.

3. Which amongst the following statements is INCORRECT?
   (A) Taxonomic keys are based on contrasting characters generally in pair called couplet.
   (B) Unicellular organisms grow by cell division.
   (C) *Systema Naturae* is the system which provides scientific name to organisms.
   (D) Sterile organisms cannot reproduce

1.2 Diversity in the Living World

1. Following are the steps for the processes that are basic to taxonomy. Arrange the steps and opt for appropriate answer.
   i. Classification ii. Identification
   iii. Characterisation iv. Nomenclature
   (A) iii → i → iv → ii (B) ii → i → iii → iv
   (C) iii → ii→ i → iv (D) ii → iii → iv → i

2. Select the INCORRECT set from the following:
   (A) Anacardiaceae – *Solanum*, *Petunia*
   (B) Primata – Gorilla, Gibbon
   (C) Carnivora – Felidae, Canidae
   (D) *Panthera* – Leopard, Tiger

3. Organisms with least similar characters, segregate under which of the following taxonomical rank?
   (A) Class (B) Genus
   (C) Family (D) Species

1.3 Taxonomic Categories

1. Match the Column I with Column II and select the correct option.

	Column I		Column II
i.	Family	a.	Includes related orders
ii.	Genus	b.	Group with fundamental similarities
iii.	Species	c.	Characterized on the basis of both vegetative and reproductive features of plant species.
iv.	Class	d.	Aggregates of closely related species

   (A) i – d, ii – b, iii – a, iv – c
   (B) i – b, ii – c, iii – d, iv – a
   (C) i – c, ii – d, iii – b, iv – a
   (D) i – d, ii – a, iii – c, iv – b

2. Which of the following statements is TRUE?
   (A) 'Class' is the aggregate of various Phyla.
   (B) Genera are the assemblage of related families.
   (C) Based on characteristics, organisms are classified into various taxa.
   (D) *Leo*, *pardus*, *tigris* are the species of genus *Felidae*.

3. Which of the following numbers represents INCORRECT classification of organism?

No.	Common name	Phylum/Division	Class	Genus	Species
i.	Mango	Angiosperm	Dicotyledonae	*Solanum*	*indica*
ii.	Man	Chordata	Mammalia	*Homo*	*sapiens*
iii.	Wheat	Angiosperm	Poales	*Triticum*	*aestivum*
iv.	Housefly	Arthropoda	Insecta	*Musca*	*pardus*

   (A) i, ii and iii (B) ii and iv (C) i, iii and iv (D) only ii

4. **Assertion:** Leopards and cats belong to different genus yet have some characters in common.
   Reason: Family has a group of related genera hence leopards and cats are put along in the family 'Felidae'.
   (A) Both assertion and reason are true and reason is the correct explanation of assertion.
   (B) Both assertion and reason are true but reason is not the correct explanation of assertion.
   (C) Assertion is true but reason is false.
   (D) Both assertion and reason are false.

5. Identify the INCORRECT statement.
   (A) *Panthera tigris* belongs to order Carnivora.
   (B) Different families in an order have less similar characters than two different genera in the same family.
   (C) Lower the category, greater is the difficulty of determining the relationship to other taxa at the same level, which makes classification more complex.
   (D) There are many ranks that are generally referred to as taxa.

6. In which of the following the common characteristics go on decreasing?
   (A) Species → Genus → Family (B) Division → Class → Order
   (C) Class → Order→ Phylum (D) Order → Family → Genus

7. Identify the ODD one out in each of the following sets and select the correct option.
   i. Hominidae, Muscidae, Monocotyledonae
   ii. Primata, Insecta, Diptera
   iii. Poales, Carnivora, Chordata
   iv. Angiospermae, Arthropoda, Dicotyledonae.
   (A) i – Monocotyledonae, ii – Diptera, iii – Poales, iv – Angiospermae
   (B) i – Hominidae, ii – Diptera, iii – Chordata, iv – Arthropoda
   (C) i – Monocotyledonae, ii – Insecta, iii – Chordata, iv – Dicotyledonae
   (D) i – Muscidae, ii – Primata, iii – Carnivora, iv – Angiospermae

8. Select TRUE statements from the following and choose the right answer from the options given below.
   i. The scientific name of humans is *Homo sapiens*.
   ii. *Systema Naturae* is written by R.H. Whittaker.
   iii. Highest taxonomic category is division
   iv. Taxonomic group of any rank is taxon.
   v. A group of closely related sp[illegible] of organisms represents genus.
   vi. The term 'systematics' was [illegible]ned by Ernst Mayr.
   (A) ii, iii, iv and vi (B) i, ii[illegible]v and v
   (C) i, iv and v (D) [illegible]iii a[illegible] vi

9. Select the correct option to complete the given table:

Common name	Phylum/Division	Class	[illegible]rder	Family
Man	Chordata	Mammalia	P[illegible]nata	(i)
Housefly	Arthropoda	(ii)	Dipt[illegible]	Muscidae
Mango	Angiospermae	Dicotyledonae	(iii)	Anacardiaceae
Wheat	Angiospermae	Mono[illegible]donae	[illegible]ales	(iv)

   (A) i - Hominidae, ii - Insecta, iii - Sapindales, iv - Poaceae
   (B) i - Hominidae, ii - Sapindales, iii - Insecta, iv - Poaceae
   (C) i - Hominidae, ii - Insecta, iii - Poaceae, iv – [illegible]pindales
   (D) i - Hominidae, ii - Sapindales, iii - Poaceae, iv - [illegible]secta

10. The species given below belong to how many different families?
    Man, housefly, mango, wheat, dog, [illegible]at, [illegible]n, tiger, potato, brinjal and leopar[illegible]
    (A) 4 (B) 7 (C) 5 (D) 6

11. Which of the following co[illegible]tions correct for wheat?
    (A) Genus : *Triticum*, Family : Poaceae, Order : Poal[illegible], Class : Dicot[illegible]edonae
    (B) Genus : *ritic*[illegible], Fa[illegible]ly : Poaceae, Order : Sapi[illegible]ales, Class : Mono[illegible]cotyle[illegible]nae
    (C) Gen[illegible] : *Tritic*[illegible], Family : Poaceae, Order [illegible]Poales, Class : Monocotyledonae
    (D) G[illegible]s *Triticum*, Family : [illegible]nac[illegible]iaceae, Order : Poales, Class : Mono[illegible]cotyledonae

12. [illegible]lect the CORRECT statement from the following.
    (A) Biological names are generally in Greek and written in italics.
    (B) Family comprises a group of related species which has more characters in common.
    (C) *Triticum aestivum* comes under the Order Sapindales.
    (D) Families like Convolvulaceae and Solanaceae are included in the same order mainly based on the floral characters.

1.4 Taxonomical Aids

1. Herbarium sheets have information about
   (A) Date and place of collection, English, local and botanical names, family, collector's name.
   (B) Time and place of collection, English local and botanical names, phylum, collector's name.
   (C) Date and time of collection, English, local and botanical names, class, collector's name.
   (D) Date and place of collection, English, local and botanical names, order, collector's name.

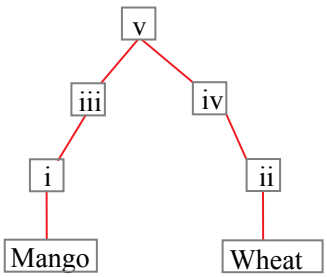
2. Read the following statements and select the correct option.
   i. As we move from higher to lower category, the number of common characteristics decreases.
   ii. Indian Botanical Garden, Howrah is famous for collection of herbarium of wild species of plants.
   iii. External and internal structure, cell structure, development process and ecological information of organisms form the basis of modern taxonomic studies.
   iv. A genus is always polytypic, i.e. it contains many species.

(A) Statement i, ii and iv are correct.
(B) Statement i, ii and iii are incorrect.
(C) Statement i, ii and iv are incorrect.
(D) Statement iii and iv are correct.

3. Which of the following is/are TRUE with reference to taxonomical aids?
i. Separate taxonomic keys are required for each taxonomic category.
ii. Herbarium is a store house of collected plants and animals.
iii. A famous botanical garden Kew (Kolkata) has collection of living plants grown for identification purposes.
iv. Keys are used for identification purpose.
(A) i and ii (B) i and iv
(C) i and iii (D) iii and iv

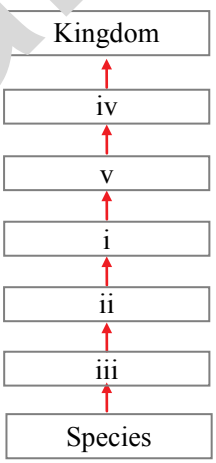
Problems To Ponder

1. Recognise the following flow diagram and the find correct option according to taxonomic hierarchy.



(A) i – Sapindales, ii – Poales, iii – Dicotyledonae, iv – Monocotyledonae, v – Angiospermae
(B) i – Anacardiaceae, ii – Poaceae, iii – Solanaceae, iv – Poales, v – Angiospermae
(C) i – *Mangifera*, ii – *Triticum*, iii – Dicotyledonae, iv – Monocotyledonae, v – Plantae
(D) i – Sapindales, ii – Poales, iii – Angiospermae, iv – Monocotyledonae, v – Plantae

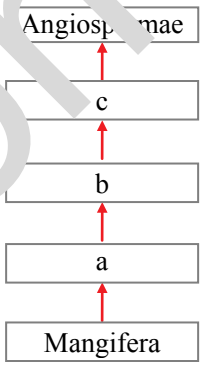
2. In the following flow diagram, identify the correct category according to the taxonomic hierarchy.



a. Primata, Diptera and Carnivora belong to category i.
b. *Petunia, Datura* and *Solanum* belongs to same category iii.
c. Angiospermae belongs to category v.
d. Man and dog shows maximum similarity at category ii.
e. Category iii is same for lion, tiger and leopard.

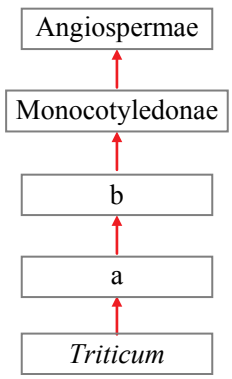
Select the correct statement.
(A) a, b, d, e
(B) b, c, d, e
(C) a, b, c
(D) a, b, e

3. Recognise the following flow diagram and find correct option according to taxonomic hierarchy.



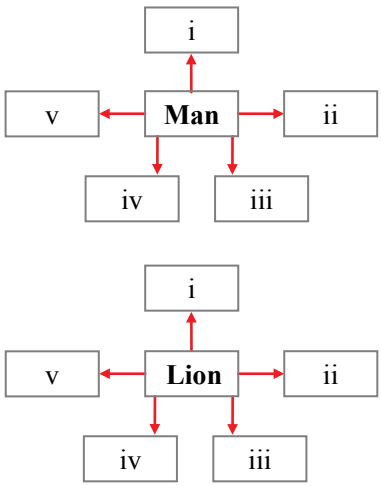
(A) 'a' is comparable to Muscidae, while 'b' is at the same level as that of Primata.
(B) 'c' includes all the angiosperms having two cotyledons in their seeds.
(C) For wheat, 'a' is Poaceae, 'b' is Poales and 'c' is Monocotyledonae.
(D) All of the above are correct statements.

4. Recognise the following flow diagram and select the correct option according to taxonomic hierarchy.



(A) a – Sapindales, b – Anacardiaceae
(B) a – Sapindales, b – Convolvulaceae
(C) a – Poales, b – Solanaceae
(D) a – Poaceae, b – Poales

5. In the given charts, if (i) represents scientific name, (ii) represents family, (iii) represents order, (iv) represents class and (v) represents phylum then, how many taxonomic categories will remain same for both man and lion?



(A) 2 (B) 3
(C) 0 (D) 1

6. Choose the CORRECT set of taxonomic words belonging to the given statements.
i. Taxonomic category showing individual organisms with fundamental similarit s.
ii. Taxonomic category with so hierarchial status.
a. Dicotyledonae b. *domesti*
c. *indica* d. Insect
e. *Mangifera* f. *sapie*
g. Mammalia
h. Monocotyledonae
i. *aestivum*
(A) bcfi; adgh
(B) abch; bcei
(C) cdef; ghia
(D) abcd; efg

Answ s to MCQ

Concept Building Problems

1.1 :	1.	(A)	2.	(C)	3.	(C)	4.	(B)	5.	(D)	6.	(B)	7.	(B)	8.	(D)	9.	(D)	10.	(D)
1.2 :	1.	(A)	2.	(D)	3.	(C)	4.	(A)		(B)	6.	(A)	7.	(C)	8.	(C)	9.	(D)	10.	(B)
1.3 :	1.	(C)	2.	(C)	3.	(B)	4.		5.	(B)	6.	(C)	7.	(C)	8.	(A)	9.	(B)	10.	(C)
	11.	(A)	12.	(C)	13.	(A)				(B)	16.	(B)	17.	(C)	18.	(D)	19.	(B)	20.	(C)
	21.	(A)	22.	(C)	23.		24.	(C)	25.	(B)	26.	(B)	27.	(C)	28.	(B)	29.	(A)		
1.4 :	1.	(B)	2.	(D)		(A)		(C)	5.	(C)	6.	(A)	7.	(C)	8.	(B)	9.	(A)	10.	(B)
	11.	(C)	12.	(D)	13	(D)														

Practi Prob ms

1.1 :	1		2.	(B)	3.	(C)														
1.2 :		C)		(A)	3.	(A)														
1.3 :	1.	(C)	2.	(C)	3.	(C)	4.	(A)	5.	(C)	6.	(A)	7.	(C)	8.	(C)	9.	(A)	10.	(B)
	11.	C)	12.	(D)																
1.4 :		(A)	2.	(C)	3.	(B)														

Problems To Ponder

1.	(A)	2.	(D)	3.	(D)	4.	(D)	5.	(A)	6.	(A)	

Hints to MCQs

Concept Building Problems

1.1 What is Living?

3. In plants, growth by cell division occurs continuously throughout their life span, while in animals, this growth is seen only upto a certain age.

6. Mules, sterile worker bees, infertile human couples do not reproduce.

7. Refer ***Smart tip - 1***
Consciousness is a defining property of living organisms.

8. Cross between horses and donkeys results in a hybrid called as mule, which is sterile.

9. Isolated metabolic reactions *in vitro* are not living things but surely a living reaction.

10. Photoperiod affects seasonal breeders, both plants and animals. Binomial nomenclature system was given by Carlous Linnaeus.

1.2 Diversity in the Living World

1. Nomenclature or naming is only possible when the organisms are described correctly.

2. Classification helps in understanding diverse varieties of organisms and also gives an idea about the origin and evolution of organisms which are morphologically similar.

3. Biological names are generally in Latin.

7. Mango – *Mangifera indica*
Human – *Homo sapiens*

1.3 Taxonomic Categories

3. Refer ***Smart tip – 2***

5. Potato – *Solanum tuberosum*
Brinjal – *Solanum melongena*

7. Refer ***Smart tip – 3***

8.

Thinking Hatke - Q. 8
As we know, in animals name of the family ends with "idae" so 'i' of column I matches with 'd' of column II. Thus, this eliminates options B, C and D. The correct answer is A.

11. Insecta – Class
Muscidae – Family
Panthera – Genera

12. Wheat belongs to Order Poales.

14. Poaceae is a category of family; rest all are orders.

15. In scientific name of leopard, *Pardus* is specific epithet which is printed incorrectly. The specific epithet starts with a small letter thus correct name is *Panthera pardus*.
The taxonomic category Class includes related orders.

16. For e.g. Primata and Carnivora are two different Orders that belong to Class Mammalia and Phylum Chordata.

17.

Thinking Hatke - Q. 17
Species is always written in small letters and in italics, so 'ii' of column I matches with 'a' of column II. This eliminates option B and D. In plants, name of the family ends with "aceae" so 'iii' of column I matches with 'c' of column II. Thus, the correct option is C.

18. Refer ***Smart tip - 2***

22. Category is a rank or level in the hierarchical classification of organisms. Angiospermae is a taxon.

24. Refer ***Smart tip – 2***

26. Based on common features like presence of notochord and dorsal hollow neural system, fishes, amphibians, reptiles, birds and mammals are included in Phylum Chordata.

28.

Thinking Hatke - Q. 28
Genus is always written in italics with first letter being capital. Therefore, options A and D are eliminated. In the ascending order genus is followed by family. As we know, name of the family ends with "aceae" in plants and "idae" in animals. This eliminates option C. Hence, the correct option is B.

29. Class – Monocotyledonae
Division – Angiospermae
Species – *indica*

1.4 Taxonomical Aids

1. A museum has collection of dead remains of plants and animals in preserved form for study and reference.

6. Each statement in the key is called as lead.

7. Kingdom, Species and order are taxonomic categories.

10. Manuals provide information for identification of species found in an area.

Practice Problems

1.1 What is Living?

1. Isolated metabolic reactions *in vitro* are not living things but surely living reactions.

3. Binomial nomenclature is the system which provides scientific name to organisms.

1.2 Diversity in the Living World

2. *Solanum* and *Petunia* belong to family Solanaceae.

3. Refer ***Smart tip - 2***

1.3 Taxonomic Categories

2. Order is the aggregate of various families. Genera is the assemblage of closely related species.
leo, *pardus*, *tigris* are the species of genus *Panthera*.

3. Mango : Genus : *Mangifera*
Wheat : Class : Monocotyledonae
Housefly : Species : *domestica*

5. Higher the category, greater is the difficulty of determining the relationship to other taxa at the same level, which makes classification more complex.

6. Refer ***Smart tip - 2***

7. i. Monocotyledonae is Class rest are Families.
ii. Insecta is Class, rest are Orders.
iii. Chordata is Phylum, rest are Orders.
iv. Dicotyledonae is Class and Angiospermae is Division and Arthropoda is Phylum.

8. ii. *Systema Naturae* is written by C. Linnaeus.
iii. Highest taxonomic category is Kingdom.
vi. The term 'Systematics' was coined by C. Linnaeus.

No.	Family	Examples
i.	Hominidae	Man
ii.	Muscidae	Housefly
iii.	Anacardiaceae	Mango
iv.	Poaceae	Wheat
v.	Felidae	Cats, lion, tiger, leopard
vi.	Canidae	Dog
vii.	Solanaceae	Potato, brinjal

12. Biological names are generally in latin and printed in italics.
Genus comprises a group of related species which has more characters in common.
Triticum aestivum comes under the Order Poales.

1.4 Taxonomical Aids

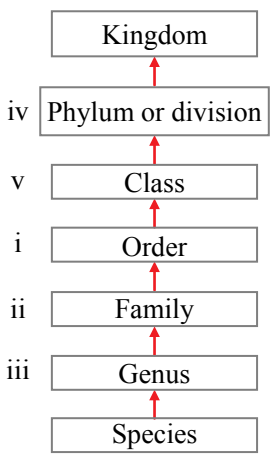
2. i. As we move from lower to higher category, the number of common characteristics decreases.
ii. Botanical gardens have collections of living plants for reference.
iv. A genus may be either monotypic, i.e. having single species or polytypic, i.e. having many species.

3. ii. Herbarium is store house of collected plant specimens.
iii. Botanical garden at Kew is in England.

Problems To Ponder

1. In option (C), Sapindales and Poales : Orders
Dicotyledonae, Monocotyledonae : Class
Angiospermae : Division
Thus, the correct taxonomic hierarchy i.e. Order → Class → Division is followed in option (A).

2.



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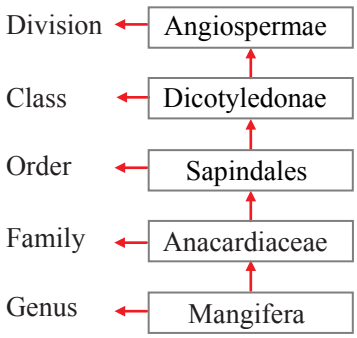

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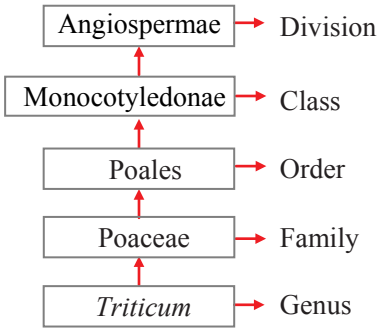

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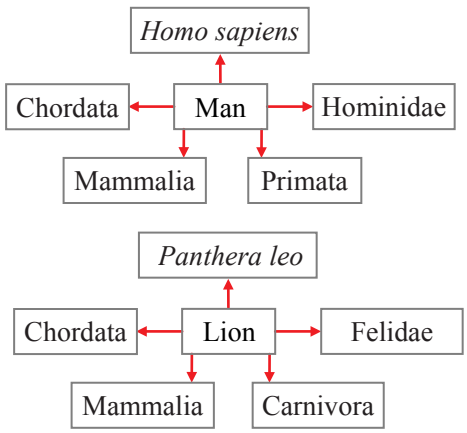

Taxonomic categories Mammalia and Chordata are same for both man and lion.

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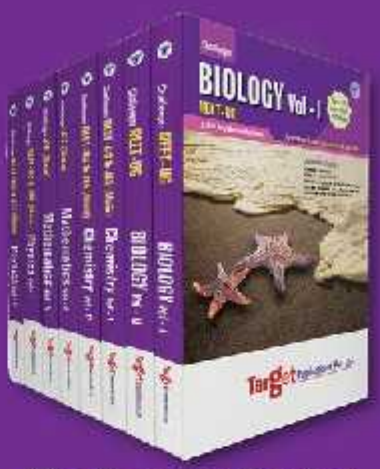

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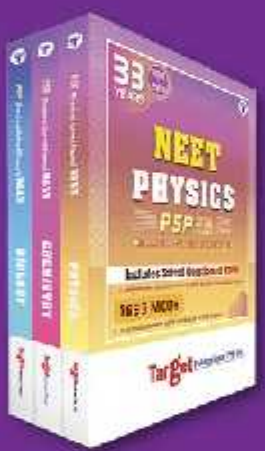

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