

BIOLOGY

NEET

CRASH COURSE

DIVERSITY IN LIVING WORLD

SMART ACHIEVERS
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THE LIVING WORLD

1. Cellular organisation of the body is the defining feature of living forms. The living world is rich in variety. About 1.7-1.8 Millions of plants and animals have been identified and described but a large number still remains unknown.
2. The very range of organisms in terms of size, colour, habitat, physiological and morphological features make us seek the defining characteristics of living organisms.
3. In order to facilitate the study of kinds and diversity of organisms, biologists have evolved certain rules and principles for identification, nomenclature and classification of organisms.
4. The branch of science dealing with these aspects is referred to as taxonomy.
5. The taxonomic studies of various species of plants and animals are useful in agriculture, forestry, industry and in general for knowing our bio-resources and their diversity.
6. The basis of taxonomy like identification, naming and classification of organisms are universally evolved under international codes.
7. Based on the resemblances and distinct differences, each organism is identified and assigned a correct scientific/biological name comprising two words as per the binomial system of nomenclature.
8. An organism represents/occupies a place or position in the system of classification. There are many categories/ranks and are generally referred to as taxonomic categories or taxa. All the categories constitute a taxonomic hierarchy.
9. Taxonomists have developed a variety of taxonomic aids to facilitate identification, naming and classification of organisms. These studies are carried out from the actual specimens which are collected from the field and preserved as referrals in the form of herbaria, museums and in botanical gardens and zoological parks. It requires special techniques for collection and preservation of specimens in herbaria and museums.
10. Herbarium serves as quick referral system in taxonomical aids.
11. Live specimens, on the other hand, of plants and animals, are found in botanical gardens or in zoological parks.
12. Taxonomists also prepare and disseminate information through manuals and monographs for further taxonomic studies.
13. Taxonomic keys are tools that help in identification based on characteristics.

BIOLOGICAL CLASSIFICATION

1. Biological classification of plants and animals was first proposed by Aristotle on the basis of simple morphological characters.
2. Linnaeus later classified all living organisms into two kingdoms -Plantae and Animalia.
3. Whittaker proposed an elaborate five kingdom classification -Monera, Protista, Fungi, Plantae and Animalia. The main criteria of the five kingdom classification were cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationship out of which mode of nutrition was most important.

4. Kingdom Monera included bacteria. Bacteria are cosmopolitan in distribution. These organisms show the most extensive metabolic diversity, although they have a simple structure. Bacteria may be autotrophic or heterotrophic in their mode of nutrition. Maximum nutrition diversity present in monera kingdom.
5. Kingdom Protista includes all single-celled eukaryotes such as Chrysophytes, Dinoflagellates, Euglenoids, Slime moulds and Protozoans. Protists have defined nucleus and other membrane bound organelles. They reproduce both asexually and sexually.
6. Members of Kingdom Fungi show a great diversity in structures and habitat. Most fungi are saprophytic in their mode of nutrition. They show asexual (by zoospore, aplanospore, conidia) and sexual (by oospores, ascospore, basidiospore) reproduction. Phycomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes are the four classes under this kingdom. Consist of coenocytic mycelium.
7. The plantae includes all eukaryotic chlorophyll-containing organisms. Algae, bryophytes, pteridophytes, gymnosperms and angiosperms are included in this group. The life cycle of plants exhibit alternation of generations-gametophytic and sporophytic generations. The heterotrophic eukaryotic, multicellular organisms lacking a cell wall are included in the Kingdom Animalia. The mode of nutrition of these organisms is holozoic. They reproduce mostly by the sexual mode.
8. Some acellular organisms like viruses and viroids as well as the lichens are not included in the five kingdom system of classification.
9. Mycoplasma (PPLO)'s is without cell wall prokaryotes.
10. Dikaryon phase ($n + n$) present in basidiomycetes and Ascomycetes.

EXERCISE**Nomenclature, Classification, Species Concept**

- Q.1 The term taxon refers to :-
 (1) Name of a species (2) Name of genus
 (3) Name of family (4) A taxonomic group of any rank
- Q.2 The basic smallest unit of classifications is :-
 (1) Genus (2) Species (3) Order (4) All of the above
- Q.3 Scientific name of Mango plant is *Mangifera indica* Linn. in the above name Linn. refers to :-
 (1) Variety of Mango
 (2) A taxonomist who proposed the present nomenclature in honour of Linnaeus
 (3) A scientist who for the first time described Mango plant
 (4) A scientist who changed the name proposed by Linnaeus and proposed present name
- Q.4 The binomial system of nomenclature was initially proposed by :-
 (1) Magnus (2) Bauhin (3) Caesalpinno (4) Discorides
- Q.5 Trinomial nomenclature of classification was proposed by :-
 (1) Linnaeus (2) Huxley and Stricklandt
 (3) John-Ray (4) Theophrastus
- Q.6 Morphologically similar but reproductively isolated species are called :-
 (1) Synchronic species (2) Sibling species (3) Allopatric species (4) Sympatric species
- Q.7 Decomposers belong to kingdom
 (1) Monera and Protista (2) Protista and Fungi (Mycota)
 (3) Monera, Protista and Fungi (4) Protista, Fungi and Animalia

History of Taxonomy

- Q.8 Taxon is the unit of
 (1) order (2) genera (3) species (4) taxonomy
- Q.9 According to Whittaker, BGA are included in :-
 (1) Mycota (2) Protista (3) Plantae (4) Monera
- Q.10 Bantham and Hooker classified dicots into :-
 (1) Polypetalae, gamopetalae and glumiflorae
 (2) Polypetalae, gamopetalae and monochlamydae
 (3) Achlamydae, diclamydeae and metachlamydae
 (4) Archichlamydae, sympetalae & apetalae
- Q.11 First phylogenetic system of plant classification was given by :-
 (1) Engler and Prantl (2) Eichler (3) Ostwald Tippo (4) Bentham & Hooker
- Q.12 Division "Tracheophyta" includes :-
 (1) Bryophyta (2) All vascular plants
 (3) All non-vascular plants (4) All non-vascular and vascular plants
- Q.13 The separation of living beings into five kingdoms is based on :-
 (1) Complexity of cell structure (2) Complexity of organism's body
 (3) Mode nutrition (4) All the above

Kingdom – Monera

- Q.14 Muramic acid is present in cell walls of :-
 (1) Bacteria (2) Green algae (3) Yeast (4) All fungi
- Q.15 Archaeobacterial cell lacks :-
 (1) Peptidoglycan (2) DNA (3) Ribosomes (4) Branched Chain Lipids
- Q.16 The function of mesosome in prokaryotes is:-
 (1) Aerobic respiration (2) Cell wall formation (3) Both (1) and (2) (4) N₂ - fixation
- Q.17 Photosynthesis of Blue green algae is:-
 (1) Oxygenic (2) Non oxygenic
 (3) Both oxygenic and non oxygenic (4) None
- Q.18 True sexual reproduction absent in :-
 (1) Yellow green algae (2) Red algae (3) Green algae (4) Blue green algae
- Q.19 Moneran phylogeny is best evidenced by sequence of nucleotides in RNA of ribosomes. On the basis of this information, the most primitive monerans are :-
 (1) Archaeobacteria (2) Eubacteria
 (3) Filamentous bacteria (4) Cyanobacteria
- Q.20 Which bacteria are utilized in Gobar gas plant :-
 (1) Methanogens (2) Nitrifying bacteria
 (3) Ammonifying bacteria (4) Denitrifying bacteria
- Q.21 Antibiotics cure disease by
 (1) Competitive Inhibition (2) Fighting with the disease causing organism
 (3) Turning the pathogen out of the body (4) Removing the pain
- Q.22 "Transformation" experiments using Pneumococcus bacteria led to hypothesis that -
 (1) DNA is genetic material (2) Bacteria have sexual reproduction
 (3) Chromosomes are made up of DNA (4) RNA is a transfer link
- Q.23 Cell membrane of bacteria is made up of -
 (1) Cellulose and lipid (2) Chitin (3) Lipid + Protein (4) Protein and Cellulose
- Q.24 nif gene is found in -
 (1) *Pseudomonas* (2) *Salmonella* (3) *Rhizobium* (4) *Mycobacterium*
- Q.25 The most primitive monerans are :
 (1) Rickettsiae (2) Actinomycetes (3) Progenote (4) Archaeobacteria

Kingdom-Protista

- Q.26 "Golden Algae" is the common name of Algae belonging to :-
 (1) Chrysophyta (2) Pyrrophyta (3) Euglenophyta (4) Cyanophyta
- Q.27 The diatoms do not easily decay like most of the other Algae because:-
 (1) They have water proof cells (2) Their walls are mucilagenous
 (3) They have highly siliceous wall (4) They are non living
- Q.28 Decomposer protists are :-
 (1) Diatoms (2) Dinoflagellates (3) Slimemoulds (4) Euglenoid

- Q.29 Taxonomists feel difficulty in classification of :-
 (1) Prokaryotes (2) Unicellular eucaryotes
 (3) Plants (4) Animals
- Q.30 Dinoflagellates glow during dark because :-
 (1) Their body contains large amount of phosphorus
 (2) Their body is covered by luminiscent layer
 (3) They absorb light and emit some part of it
 (4) Of presence of photogenic granules
- Q.31 A dinoflagellate which is also known as sea ghost.
 (1) Euglena (2) Ceratium (3) Noctiluca (4) Gonyaulax
- Q.32 "Keiselgurh" is :-
 (1) Silicified deposits of Diatoms (2) Calcified deposits of Diatoms
 (3) Pigments of Diatoms (4) Deposits of calcium oxalate in Euglenoids
- Q.33 Auxospores are formed by -
 (1) Diatoms (2) Euglenoids (3) Dinoflagellates (4) bacteria
- Q.34 Protists which are diploid reproduce sexually by the process of -
 (1) Zygotic meiosis (2) Cyst formation (3) Binary fission (4) gametic meiosis.
- Q.35 'Red tides' are produced by -
 (1) Red algae (2) Dinoflagellates (3) Diatoms (4) Brown algae
- Q.36 PSP (Paralytic shellfish poisoning) is connected with
 (1) Gonyaulax (2) Ceratium (3) Noctiluca (4) Glenodinium

Kingdom – Mycota

- Q.37 Which of the following characters indicate similarity between fungi and animals :-
 (1) Heterotrophic nutrition (2) Type of stored food
 (3) Presence of chitin (4) All the above
- Q.38 *Neurospora*, which is popularly known as Drosophilla of plant kingdom, belongs to :-
 (1) Phycomycetes (2) Ascomycetes (3) Basidiomycetes (4) Deuteromycetes
- Q.39 *Penicillium roquefortii* and *P. camemertii* are used in the preparation of cheese. These fungi belong to class :-
 (1) Zygomycetes (2) Oomycetes (3) Deuteromycetes (4) Ascomycetes
- Q.40 Coenocytic mycelium is found in :-
 (1) Rhizopus (2) Mucor (3) Penicillium (4) Both 1 and 2
- Q.41 Which is commonly called "Drosophilla of plant kingdom" :-
 (1) Morchella (2) Neurospora (3) Rhizopus (4) Claviceps
- Q.42 Edible part in mushrooms is :-
 (1) Basidiospores (2) Mycelium (3) Pseudomycelium (4) Complete basidiocarp
- Q.43 Fungi which requires two different hosts to complete it's life cycle is called as :-
 (1) Homothallic (2) Heterothallic (3) Heteroecious (4) Autoecious
- Q.44 Which of the following is called 'toad stools' :-
 (1) All mushrooms (2) Edible mushrooms
 (3) Poisonous mushrooms (4) None

- Q.45 Yeast grows more quickly in :-
 (1) Salt water (2) Sugar solution
 (3) Double distilled water (4) Marine water
- Q.46 Sexual reproduction absent in :-
 (1) Phycomycetes (2) Deuteromycetes (3) Zygomycetes (4) Basidiomycetes
- Q.47 Non-septate mycelium occurs in :-
 (1) Phycomycetes (2) Ascomycetes (3) Basidiomycetes (4) Deuteromycetes
- Q.48 Clamp connections present in:-
 (1) Basidiomycetes (2) Ascomycetes (3) Deuteromycetes (4) Phycomycetes
- Q.49 Aspergillosis is caused by :-
 (1) Virus (2) Bacteria (3) Fungi (4) Mycoplasma
- Q.50 Which fungal disease spreads by seed and flowers :-
 (1) Loose smut of Wheat (2) Corn stunt
 (3) Covered smut of Barley (4) Soft rot of Potato

AIIMS Special

Instructions for following questions (Q.51 to Q.75).

- (1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
 (2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
 (3) If Assertion is true statement but Reason is false, then mark (3).
 (4) If both Assertion and Reason are false statements, then mark (4).
- Q.51 **Assertion :** De Candolle introduced the term taxonomy.
Reason : He proposed plants classification in his book "Theorie Elementaire de la Botanique".
- Q.52 **Assertion :** Species is a genetically closed system.
Reason : Because the reproductive isolation constitutes the most important boundary between different species.
- Q.53 **Assertion :** Scientific names have been standardized through ICBN.
Reason : First international botanical congress was held in Paris in 1967.
- Q.54 **Assertion :** Dried specimens are poisoned by HgCl_2 .
Reason : It prevents the specimen from the moisture.
- Q.55 **Assertion :** Members of a species are reproductively isolated from others belonging to other species.
Reason : Species is the basic taxonomic category.
- Q.56 **Assertion :** A group of closely related families form an order.
Reason : The families of an order show close resemblance in certain fundamental features and also in evolutionary trends.
- Q.57 **Assertion :** Biological concept of species is based on reproductive isolation.
Reason : Tigon is interspecific sterile hybrid produced in captive condition.
- Q.58 **Assertion :** Synonyms are concerned with most important of all rules of ICBN.
Reason : Out of the two or more scientific names given to the organism, the oldest name is recognized as valid name and other names as synonyms.
- Q.59 **Assertion :** Arboretum is ex-situ conservation strategy of plants.
Reason : It is a special kind of garden with main collection of herbs and shrubs.
- Q.60 **Assertion :** Two plants A and B are treated as two taxonomic species.
Reason : Both A and B are different in correlated characters.

- Q.61 **Assertion** : Cellular slime moulds have the characters of both plants and animals.
Reason : Reproductive phase is animal like and vegetative phase is plant like.
- Q.62 **Assertion** : Outer membrane is present in Rhizobium.
Reason : Outer membrane contains lipopolysaccharides.
- Q.63 **Assertion** : Lichens do not grow in polluted area having SO₂.
Reason : Lichens secrete carbonic acid and oxalic acid on barren rocks.
- Q.64 **Assertion** : Secondary mycelium of Agaricus is binucleated.
Reason : Secondary mycelium is formed by somatogamy of primary mycelium.
- Q.65 **Assertion** : Cyphellae help to retain moisture in lichens.
Reason : It contains large number of hyaline cells.
- Q.66 **Assertion** : Unicellular eukaryotes are included in Monera.
Reason : Unicellular eukaryotes have 70S cytoribosomes.
- Q.67 **Assertion** : Lamellosome connects nucleoid to cell membrane.
Reason : Lamellosome is present in oxyphotobacteria.
- Q.68 **Assertion** : Pseudomonas fluorescens is cephalotrichous bacteria.
Reason : It is helpful in retting of fibres.
- Q.69 **Assertion** : MLOs are pleomorphic and non-motile monerans.
Reason : They are resistant to antibiotics like penicillin.
- Q.70 **Assertion** : Gram positive bacteria detect and respond to chemicals by lipopolysaccharides.
Reason : They have high amount of porins and lipids which act as antigen.
- Q.71 **Assertion** : Holophytic protists are important phytoplanktons and they contribute 80% of the total photosynthesis.
Reason : They lack chemosynthetic nutrition and utilize non sulphur organic compound as the source of electron and proton in carbon assimilation.
- Q.72 **Assertion** : Sexual spores in pink mould are meiospores produced endogenously.
Reason : They develop flask shaped fruiting body in sexual life cycle.
- Q.73 **Assertion** : Azotobium lichens are biofertilisers enriching nitrogen contents in soil.
Reason : This ability is due to the presence of heterocystous blue-green algae as phycobiont component.
- Q.74 **Assertion** : Viroids are not included in five kingdom system.
Reason : They are acellular.
- Q.75 **Assertion** : Viruses which infect animals generally possess ssRNA or dsRNA or dsDNA.
Reason : Phytophagines generally contain dsDNA.

ANSWER KEY

Q.1	4	Q.2	2	Q.3	3	Q.4	2	Q.5	2	Q.6	4	Q.7	3
Q.8	4	Q.9	4	Q.10	2	Q.11	2	Q.12	2	Q.13	4	Q.14	1
Q.15	1	Q.16	3	Q.17	1	Q.18	4	Q.19	1	Q.20	1	Q.21	1
Q.22	1	Q.23	3	Q.24	3	Q.25	4	Q.26	1	Q.27	3	Q.28	3
Q.29	2	Q.30	4	Q.31	3	Q.32	1	Q.33	1	Q.34	4	Q.35	2
Q.36	1	Q.37	4	Q.38	2	Q.39	4	Q.40	4	Q.41	2	Q.42	4
Q.43	3	Q.44	3	Q.45	2	Q.46	2	Q.47	1	Q.48	1	Q.49	3
Q.50	1	Q.51	2	Q.52	1	Q.53	3	Q.54	3	Q.55	2	Q.56	1
Q.57	3	Q.58	1	Q.59	3	Q.60	1	Q.61	3	Q.62	2	Q.63	2
Q.64	1	Q.65	4	Q.66	4	Q.67	2	Q.68	2	Q.69	2	Q.70	4
Q.71	3	Q.72	2	Q.73	1	Q.74	1	Q.75	3				