BOTANICAL GARDENS, HERBARIA AND RESEARCH INSTITUTE

(1) **Oldest** botanical garden is **"Padua Botanical Garden"** Italy (Established - 1545).

(2) **Largest** Botanical garden in the world is **Toyal Botanical Garden, Kew Surrey,** England, established by **William Aiton,** 1759.

(3) **Largest** herbarium of the world is **"Museum of Natural History"- Paris-** with a collection of 8880000 specimens.

(4) **Largest** Botanical Garden of Asia in **Indian Botanical Garden, Sibpur, Kolkata.** Established by Rober Kyd, 1786.

- ☛ Largest herbarium of Asia is **Central National Herbrium** located in Indian Botanical Garden, with a collection of 25 lack specimens.
- ☛ Indian Botanical Garden is famous due to the presence of **"Great Banyan Tree"** in its campus.
- ☛ In campus of Indian Botanical Garden **Botanical Survey of India (BSI)** is present which is established by **William Rouxburgh** 1890.
- ☛ **BIS** $\rightarrow$ Botanical Survey in India is done by BSI

(5) **National Botanical Garden,** Lucknow, **National Botanical Research Institute (NBRI)** is located in National Botanical Garden.

(6) **Forest Botanical** Garden, Dehradun - **Forest Research Institute** (FRI) located in Forest Botanical Garden.

(7) **Lloyd Botanical Garden - Darjeeling.**

(8) **CDRI -** Cenral Drug Research Institute - **Lucknow**

(9) **CAZRI** - Central Ariz Zone Researh Institute - **Jodhpur.**

(10)**CIMAP -** Central Institute of Medicinal and Aromatic Plants - **Lucknow**

(11)**IARI** - Indian Agriculture Researh Inst. (Pusa Inst.) - **New Delhi**

(12)**Birbal Sahni Institute of Paleobotany** (National inst. of paleobotany) - **Lucknow**

Comparison of Dicotyledons and Monocotyledons

Character	Dicotyledons	Monocotyledons
Morphology	Tap roots Reticulate venation Tetra - or pentamerous flowers	Adventitious root Parallel venation Timorous flowers
Anatomy	Vascular bundles arranged in a ring numbering 2-6 Open and with cambium	Vascular bundles scattered in the ground tissue, many in number Closed and without cambium.

DIFFERENCES BETWEEN ALGAE AND FUNGI

	Algae	**Fungi**
1.	The chlorophyll is present in algae.	The chlorophyll is absent in fungi.
2.	Algae are autotrophic and synthesize organic food materials by a process of photosynthesis.	Fungi are heterotrophic thus, obtain their food materials as saprophytes or parasites.
3.	The cell wall is made up of cellulose impregnated with pectic compounds.	The cell wall is made up of chitin of fungal cellulose
4.	The thallus is filamentous or consists of true parenchyma.	The thallus is consists of filamentous mycelium and form pseudoparenchyma.
5.	Algae usually present in places where light is available.	Fungi grow in dark or diffused light.
6.	The reserve food material is in the form of starch.	The reserve food material is in the form of oil and glycogen.
7.	The sexual reproduction in primitive algae is simple and in advanced algae it is progressively complexed.	The sexual reproduction in primitive fungi is complex and in advanced fungi it is simple and reduced.

COMPARATITIVE ACCOUNT OF THREE DOMAIN OF CARL WOESE'S SYSTEM

Characters	**Bacteria**	**Archaea**	**Eukarya**
Habitat	Soil, water and air (cosmopolitan), In all kinds of habitats	Soil, water and air specially in unfavourable habitats or extreme habitats	Specially in soil and water
Cellular organisation	Unicellular, prokaryotes	Unicellular prokaryotes	Mostly Multi Cellular eukaryotes
Cell wall	Made up of mucopeptide	Cell wall do not made up of mucopeptide instead consist of complex polysaccharisdes and polypeptides	Cell wall consist of chitin and cellulose. In animalia cell was is lacking.
Intron in RNA	Absent	Present	Absent

BRYOPHYTA

S.No.	**Characters**	**Hepaticae**	**Anthocerotae**	**Musci**
1.	Common Name	Liverwort	Hornword	Moss
2.	Rhizoids	Unicellular and unbranched	Unicellulr and unbrahcned	Multicellular and branched with oblique septum.
3.	Leaf	The leaves found in foliose forms and are never spiral. The leaer withtout a mid rib	Absent	The leaves are invariably spirally arranged with prominent mid rib.
4.	Scales	Present	Absent	Absent
5.	Sporogonium Or sporophyte	Usually simple structure with foot, sedt and capsule	It has only foot and capsule	The sporogonium show well organized foot, seta and capsule

COMPARATIVE ACCOUNT OF IMPORTANT CHARACTERISTICS OF FIVE KINGODM

S. No.	Kingdom	Cellorganization and cell types	Meansof mobility	Mode of Nutrition	Reproduction	Members
1	Monera	Unicellularpr karyotic, lacks main cell organelles	Motile by Means of Flagella	Byphotosnthesis or absorption	Asexual,binary fissin or budding	Archae bacteria, eubcteria blue green algae, my coplasmas
2	Protista	Unicellular, eukaryotic, All cell Organelles present	Non motile or motile By means Of flagella or cilia	By photosynthesi orabsorption Or some time holozoic	Assexual and sexual reproduction	Protozoans Euglena, slime moulds
3	Fungi or Mycota	Multicellular but eukryotic plastic absent	Lackmotility, motilityin gamates	By absorption	Asexual and sexual reproduction	Fungi (bread mould, yeast etc.)
4	Plantae	Multicellular, eukryotic, plastid and all other cell Organanelles present	Lack motility (non-motile forms) motility in Gametes	Predominatnly Photosynthetic	Asexual vegetative and sexual reproduction	Plants (algae mosses, ferns conifers flowering plants)
5	Animalia	Multicellular, eukaryotic, plastid absent and all other cell organelles present	Motile form motility by muscle fibres	Heterotrophic mode Of nutriction mainly by ingestion.	Mainly sexual reproduction	Animls (worms insects, Amphibians, reptiles mammals etc.

CLASSES OF ALGAE AND THEIR MAIN CHARACTERISTICS						
Classes	**Common Name**	**Major Pigments**	**Stored Food**	**Cell Wall**	**Flagellar Number and Position of Insertions**	**Habitat**
Chlorophyceae	Green algae	Chlorophyll a,b	Starch	Cellulose	2-8, equal, apical	Fresh water brackish Water salt Water
Pheophyceae	Brown algae	Chlorophyll a,c, fucoxanthin	Mannitol, laminarin	Cellulose and algin	2-unequal, lateral	Fresh water (rare) brackish water salt water
Rhodophyceae	Red algae	Chlorophyll a,d, phycoerythin	Floridean starch	Cellulose	Absent	Fresh water (some) brackish water, salt water (most)

NOMENCLATURE, CLASSIFICATIOIN, SPECIES CONCEPT

1. Most acceptable concept of species is :
(1) Static concept (2) Biological concept
(3) Typological concept (4) Genetic concept

2. Artificial system of classification classifies plant on the basis of :
(1) One or two characters
(2) Phylogenetic trends
(3) Many naturally existing characters
(4) None of the above

3. The term new systematic was introduced by :
(1) Linnaeus (2) Bentham
(3) Hutchinson (4) Husley

4. Group of organisms that closely resemble each other and freely interbreed in nature, constitute a
(1) Species (2) Genus
(3) Family (4) Taxon

5. ICBN was first revised in :
(1) 1961 (2) 1964
(3) 1975 (4) 1753

6. The term taxon refers to :

(1) Name of a species

(2) Name genus

(3) Name of family

(4) A taxonomic group of any rank

7. The herbarium specimen on whose basis a new species is described for the first time is called as
(1) Syntype (2) Holotype

(3) Pratype (4) Neotype

8. The scientific naming of plants begain with publication of Linnaueus book :

(1) Genera plantarum (2) Systema naturae

(3) Species plantarum (4) Charaka sanhita

9. Which book most impressed the opinion of taxonomis :

(1) Enquiry into plants (2) Origin of life

(3) Genera plantarum (4) Origin of species

10. The basis unit of classifications is :
(1) Genus (2) Species
(3) Order (4) All of the above

11. Suffix for sub species is :
(1) Phytina (2) Oideae
(3) Ineae (4) None

12. Individuals of same species having non-genetic differences due to environment are called :
(1) Biotypes (2) Ecotype
(3) Ecophenes (4) None

13. Morphologically similar but reproductively isolated species are called :
(1) Neontological species
(2) Sibling species
(3) Allpatric species
(4) Morpho-species

14. Plant nomenclature means :
(1) To give names to plants without any rules
(2) Noemnclature of plants under the internations rules
(3) Nomenclature of plants in local language
(4) Nomenclature of plants in English language

15. Taxonomy refers to :
(1) Plant classification
(2) Plant nomenclature
(3) Plant affinity
(4) All the above

16. Which of the following is a correct name :
(1) ***Solanum tuberosum***
(2) ***Solanum Tuberosum***
(3) ***Solanum tuberosu*** Linn
(4) All the above

17. Systematics deals with :
(1) Classification
(2) Nemonclature
(3) Plant description
(4) Plant exploration

18. Scientific name of Mango plant is ***Mangifera indica*** (Linn.) Santapau in the above name Santapau 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

19. Type specimen selected from the original material in case the holotype is missing, is called
(1) Lectotype (2) Neotype
(3) Syntype (4) Partype

20. Phylogeny refers to :

(1) Natural classification

(2) Evolutionary classification

(3) Evolutionary history

(4) Origin of algae

21. Static concept of species is given by :
(1) Linnaeus (2) Bentham
(3) Koch (4) Mayr

22. In taxonomy the first step is :
(1) Identification (2) Nomenclature
(3) Classification (4) Affinities

23. The suffix - inae signifies the rank :
(1) Tribe (2) Subtribe
(3) Suborder (4) Sub family

24. Species living in different geographical areas are called :
(1) Allochronic (2) Allopatic
(3) Sympatric (4) Sibligs

25. A large number of unknown species of plants and animals re believed to the present in :
(1) Temperate forests (2) Antarctica

(3) Taiga (4) Tropical forest

26. Biological concept of species proposed by :
(1) Linnaues (2) Mayr

(3) John Ray (4) De Candolle

27. For higher plants, flowers are chiefly used as a basis of classification, because -

(1) These show a great variety in colour

(2) It can e preserved easily

(3) Reproductive pars are more conservative than vegetative parts
(4) None of these

28. Individuals of some species having genetic variation and occur in same environment are called -
(1) Biotypes (2) Ecotype
(3) Ecophenes (4) Ecads

29. The smallest unit of classification is :
(1) Family
(2) Order
(3) Genus
(4) Species

30. The binomial system of nomenclature was initially proposed by :
(1) Magnus
(2) Bauhin
(3) Caesalpinno
(4) Discorides

31. Biochemical resemblances are used in the identification of :
(1) Protistan species
(2) Moneran species
(3) Fungal species
(4) Higher plants

32. Concept of phylogeny was proposed by :
(1) John Ray
(2) Lamarck
(3) Ernest Haeckel
(4) Darwin

33. A division is formed by combining several :
(1) Orders (2) Families
(3) Classes (4) Tribes

34. An international code of botanical nomenclature was first proposed in the year :
(1) 1930 (2) 1830
(3) 1913 (4)1813

35. For declaration of new species of higher plants what characters are used :
(1) Floral character of new species
(2) Anatomical characters of new species
(3) Physiological character of new species
(4) Character of endosperm

36. The standard size of herbarium sheets is :
(1) 11.5” × 16.5” (2) 15.5” × 16.5”
(3) 18.5” × 10.5” (4) 20.5” × 21.5”

37. Which statement is true -
(1) Tautonyms do not occur in plants
(2) Tautonyms do not occur in animals
(3) Tautonyms normally occur in animals and some time occur in plants
(4) Tautonyms occur only in bacteria

38. Trinomial nomenclature of classification was proposed by :
(1) Linneaus
(2) Husley and Stricklandt
(3) John-Ray
(4) Theophrastus

39. Most of the botanical names re drawn from the following language :
(1) German (2) Greek
(3) Latin (4) Spanish

40. Evolutionary classification is called :
(1) Artificial system
(2) Natural system
(3) Phylogentic system
(4) None of the above

41. Which of the following statements regarding nomenclature is correct :
(1) Generic name always begins with capital letter whereas specific name with small letter
(2) Scientific name should be printed in italics
(3) Scientific name when types or handwritten should be underlined
(4) All the above

42. The systematic arrangement of taxa is called :
(1) key (2) Taxonomy
(3) Geneology (4) Hierarchy

43. Which is the most important by generally not used criteria for the identification of the species -
(1) Interbreeding
(2) Morphology
(3) Genetic material
(4) None

44. Number of obligatory categories in taxonomy are:
(1) 7 (2) 8
(3) 9 (4) 5

45. Herbrium is :
(1) A garden where medicinal plants are grown
(2) Garden where herbaceous plant are grown
(3) Dry garden
(4) Chemical to kill plants

46. The year of publication of “Species plantarum” :
(1) 1853 (2) 1857
(3) 1753 (4) 1786

47. The biological concept of species is mainly based on :
(1) Morphological features
(2) Morphology and method of reproduction
(3) Method of reproduction only
(4) Reproductive isolation

48. A duplicate of holotype is called :
(1) Isotype (2) Syntype
(3) Neotype (4) Paratype

49. Term taxom given by :
(1) Adolf Mayer (2) Linaeus
(3) Darwin (4) Koch

50. Which of the following is a species :
(1) ***Tamarindus*** (2) ***Indicus***
(3) ***Indica*** (4) ***Tamarindus indicus***

51. Tautonyms re valid names according to :
(1) NCBN (2) Species pantarum
(3) Gener plntarum (4) ICZN

52. Practical significance of taxonomy is :
(1) Classification
(2) To understand diversity
(3) To understand evolution
(4) Identification of organism

53. Which name of invalid :
(1) Name not published in species plantarum
(2) Name proposed prior to 1961
(3) Name whish is not in latin

(4) Name for which holotype is not designated

54. Which system classified a plant in more than one groups :
(1) Practical classification
(2) Artificial classification
(3) Natural classification
(4) Phylegenetic classification

55. Authod of book ***"Flora British Indica" :***
(1) Father Santapau
(2) J.D. Hooker
(3) Willim Rouxburgh
(4) G. Bentham

NOMENCLATURE, CLASSIFICATION, SPECIES CONCEPT ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**3**	**1**	**4**	**1**	**3**	**4**	**2**	**3**	**4**	**2**	**4**	**3**	**2**	**2**	**4**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**3**	**4**	**1**	**3**	**1**	**1**	**2**	**2**	**4**	**2**	**3**	**1**	**4**	**2**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**2**	**3**	**3**	**1**	**1**	**1**	**1**	**2**	**3**	**3**	**4**	**4**	**1**	**1**	**3**
Que.	46	47	48	49	50	51	52	53	54	55					
Ans.	**3**	**4**	**1**	**1**	**4**	**4**	**4**	**4**	**1**	**2**					