



Sample Paper- 03

Class 11<sup>th</sup> NEET (2024)

**BOTANY**

**Answer Key**

1. (4)
2. (4)
3. (2)
4. (4)
5. (4)
6. (1)
7. (3)
8. (3)
9. (3)
10. (3)
11. (4)
12. (2)
13. (1)
14. (3)
15. (3)
16. (4)
17. (3)
18. (1)
19. (3)
20. (2)
21. (4)
22. (1)
23. (3)
24. (4)
25. (1)

26. (4)
27. (4)
28. (4)
29. (2)
30. (1)
31. (1)
32. (2)
33. (3)
34. (1)
35. (1)
36. (2)
37. (3)
38. (1)
39. (2)
40. (1)
41. (3)
42. (1)
43. (3)
44. (2)
45. (2)
46. (1)
47. (1)
48. (2)
49. (3)
50. (1)



### Hint & Solution

1. (4)  
Yeast reproduces through budding, not conidia. Conidia are a type of asexual spore produced by certain fungi, but yeast reproduces differently through the formation of buds or daughter cells.
2. (4)  
Ernst Mayr is credited with formulating the Biological Species Concept, which defines a species as a group of interbreeding natural populations that are reproductively isolated from other such groups. This concept is a foundational idea in modern biological classification and species definition.
3. (2)  
According to binomial nomenclature, each living organism is given a scientific name consisting of two components: the genus name (capitalized) followed by the species name (in lowercase), both in Latinized form. This naming system was developed by Carl Linnaeus and is used to uniquely identify and classify species.
4. (4)  
Primata & Diptera
5. (4)  
*Trypanosoma* are indeed flagellated protozoans that are parasitic in nature, and they can cause diseases like sleeping sickness. So, all the statements are correct.
6. (1)  
Natural classification systems were based on natural affinities among the organisms and consider, not only the external features, but also internal features, like ultrastructure, anatomy, embryology and phytochemistry.
7. (3)  
Mucor is a fungus commonly found on bread and other decaying organic matter. For its optimum growth on a piece of bread, the following conditions are essential:  
(a) Temperature of about 25°C - Mucor typically grows best at moderate temperatures, and 25°C is within the favorable range for its growth.  
(d) Relative humidity of about 95% - Mucor thrives in moist environments, and a high relative humidity is conducive to its growth.  
(e) A shady place - Mucor prefers dark or shaded environments for growth. Direct sunlight can inhibit its growth.  
So, the combination of (a), (d), and (e) creates the most suitable conditions for the optimum growth of Mucor on a piece of bread.
8. (3)  
The pathogen of white rust disease belongs to the group Phycomycetes.
9. (3)  
Natural system of classification was based on number of characters. It focuses on similarities and dissimilarities and classified according to their related characters.
10. (3)  
The major pigments in green algae are Chlorophyll a (Chl a) and Chlorophyll b (Chl b), and the stored food is typically starch.
11. (4)  
Members of the genus *Nereocystis*, commonly called bull kelps, are annual kelps that grow primarily in deep waters and rapid tideways and can attain lengths up to 40 metres (130 feet).
12. (2)  
Protonema is the juvenile phase of a moss gametophyte. In mosses, the life cycle includes two distinct phases: the gametophyte and the sporophyte. The protonema is the initial stage of the gametophyte phase. It consists of a mass of branching, green, thread-like structures that grow from the spores. Over time, the protonema develops into the mature gametophyte, which produces the reproductive structures (male and female gametangia) responsible for sexual reproduction in mosses. This phase represents the early growth and establishment of the moss plant before it reaches maturity.
13. (1)  
In Bryophytes the free living gametophyte is the dominant phase. It is larger than the sporophyte and is nutritionally independent. The sporophyte is nutritionally partially dependent on gametophyte and grows out of the gametophyte.



14. (3)  
Phylogenetic classification is based on evolutionary relationships, and organisms within the same taxa share a common ancestor in their evolutionary history. This classification system considers genetic and evolutionary relatedness among organisms, so having a common ancestor is a fundamental concept in phylogenetics.
15. (3)  
Chrysophytes include diatoms and desmids. The body of diatoms is covered by a transparent siliceous shell (silica deposited in cell wall) known as frustule. The frustule is made of two valves, epitheca and hypotheca, which fit together like a soap box.
16. (4)  
Natural classification system is based on natural affinities among the organisms. It takes into account external features along with internal features such as ultrastructure, anatomy, embryology and phytochemistry. Such a classification for flowering plants was given by George Bentham and Joseph Dalton Hooker.
17. (3)  
(a) Tap root system - (ii) Mustard  
(b) Prop root - (iii) Banyan  
(c) Fibrous root system - (iv) Wheat  
(d) Adventitious roots - (i) *Monstera*
18. (1)  
Secondary and tertiary roots of tap root are borne in acropetal succession.
19. (3)  
Pseudopodia is the locomotory organ in amoeboid protozoans, e.g.,  
Amoeba. Flagellated protozoans possess flagella for locomotion, e.g.,  
Trypanosoma. In sporozoans, locomotory organelles (cilia, flagella, pseudopodia, etc.) are absent, e.g.,  
Plasmodium. Ciliated protozoans possess cilia as locomotory organelles, e.g., Paramecium.
20. (2)  
In Pinus/gymnosperms, endosperm is produced before fertilization and hence it is haploid. Megaspore and pollen grains are structures of male gametophytes and it is also haploid.
21. (4)  
"It bears a bud in its axil." is correct about leaves. In many plants, the axil of a leaf is the location where you can find buds, which can give rise to new branches or leaves. This is why you often see new growth emerging from the axils of leaves on a plant.
22. (1)  
"Some leguminous plants" is correct. In certain leguminous plants, such as *Mimosa pudica* (sensitive plant), the leaf base is swollen to form a structure called the pulvinus. The pulvinus allows the leaf to exhibit rapid leaf movement in response to touch or environmental stimuli, a phenomenon known as thigmonasty. This adaptation is particularly noticeable in plants like the sensitive plant, where the leaves fold or droop when touched.
23. (3)  
The thin and flexible petiole of a leaf allows the leaf lamina (the flattened, blade-like part of the leaf) to flutter or move in the wind. This movement helps in cooling the leaf and bringing fresh air to the leaf surface. It can also disrupt the boundary layer of still air around the leaf, which in turn can reduce the rate of transpiration and help the leaf exchange gases more efficiently with the surrounding atmosphere.
24. (4)  
Castor is the endospermic seed. In castor seeds, the endosperm is the primary storage tissue, and it nourishes the developing embryo.
25. (1)  
The aleurone layer in maize seed is rich in proteins.
26. (4)  
Br- Bracteate, K- calyx C- corolla, A- androecium, G- gynoecium, ♂ Male flower, ⊕- actinomorphic, %- zygomorphic, ♀- female flower



27. (4)  
Cymose inflorescence is also called definite or determinate inflorescence. Growth of the peduncle is definite. Here, the terminal bud is modified into a flower. Flowers develop in basipetal succession, i.e., mature flowers are towards the apex and young flower buds are towards the base. Flowers open in centrifugal sequence, i.e., flowers open from centre to the periphery of the inflorescence, e.g., *Solanum*, *Ranunculus*, *Datura*, *Gossypium*, etc.
28. (4)  
Sieve tube elements in the phloem have specialized end walls called sieve plates, which are perforated like a sieve to allow for the flow of sap and nutrients through the phloem.
29. (4)  
Assertion- Chemotaxonomy classify organism at molecular level.
30. (1)  
In monocot root, a large number of vascular bundles are arranged in the form of a ring around the central pith. Vascular bundles are closed because there is no cambium present between the xylem and phloem.
31. (4)  
 $X - G_1$ ;  $Y - S$ ;  $Z - G_2$
32. (1)  
PS-I the reaction centre Chl *a* has absorption maxima at  $P_{700}$  while in PS-II the reaction centre Chl *a* has absorption maxima at  $P_{680}$ .
33. (4)  
Presence of carotenes in chloroplast helps protecting chlorophyll molecules from photooxidation
34. (1)  
Phaeophyceae commonly found in salty water.
35. (1)  
The core of cilia and flagella is called the "axoneme." It consists of microtubules arranged in a specific pattern, providing structural support and allowing for movement.
36. (2)  
S phase: Cells are diploid ( $2n$ ) with a DNA content of  $4C$ . DNA replication occurs during this phase. S phase -  $2n$  (diploid) -  $4C$  (double the DNA content)
37. (3)  
The plane of alignment of the chromosomes at metaphase is referred to as the "metaphase plate."
38. (1)  
At anaphase I of meiosis, each chromosome has two chromatids.
39. (2)  
During meiosis, the first division is called the reductional division because it reduces the chromosome number in half, and the second division is called the equational division because it does not change the chromosome number but separates sister chromatids. This results in the production of haploid gametes from diploid parent cells.
40. (4)  
The main difference between a dividing animal and plant cell lies in cell plate formation. In animal cells, a cleavage furrow forms during cytokinesis, pinching the cell into two daughter cells, while in plant cells, a cell plate forms in the middle of the cell and eventually develops into a new cell wall, dividing the cell into two daughter cells
41. (1)  
Both *Sellaginella* and *Salvinia* are heterosporous
42. (2)  
Exchange of genetic material is called crossing over.
43. (3)  
Ingenhousz showed that sunlight is essential for plants



44. (1)

PEP is the primary carbon di acceptor in  $C_4$  plants. RUBP is the primary carbon do oxide acceptor in  $C_3$  plants.

45. (2)

$C_4$  plants have a unique carbon fixation mechanism where initial carbon fixation occurs in mesophyll cells, forming a  $C_4$  compound (usually oxaloacetate or malate). This  $C_4$  compound is then transported to bundle sheath cells where the Calvin cycle takes place. This separation of initial carbon fixation and the Calvin cycle is an adaptation to reduce photorespiration and increase the efficiency of photosynth

46. (3)

Under water stress, both stomatal closure and reduced water potential can lead to a decline in the rate of photosynthesis.

**Stomatal Closure:** When a plant experiences water stress, it often closes its stomata to reduce water loss through transpiration. However, this also reduces the supply of carbon dioxide ( $CO_2$ ) to the leaf, limiting the availability of  $CO_2$  for photosynthesis.

**Reduced Water Potential:** Water stress can lead to a reduction in the water potential of plant cells, making it more difficult for the cells to take up water from the soil. This can result in reduced turgor pressure and decreased leaf surface area available for photosynthesis.

47. (1)

Glucose (6 carbons) + 2 ATP + 2  $NAD^+$  + 4 ADP + 4  $P_i$   $\rightarrow$  2 Pyruvate (3 carbons) + 4 ATP + 2  $NADH$  + 2  $H_2O$ .

This equation represents the conversion of one molecule of glucose into two molecules of pyruvate, along with the generation of ATP (adenosine triphosphate) and  $NADH$  (nicotinamide adenine dinucleotide), and the consumption of ATP and  $NAD^+$ . Glycolysis is the first step in both aerobic and anaerobic respiration and occurs in the cytoplasm of cells.

48. (2)

The stomata are bordered by two specialised epidermal cells - the guard cells which in some cases are accompanied by subsidiary cells. The walls of guard cells are unevenly thickened. Each guard cell has thick, inelastic inner wall and thin, elastic outer wall. Stomatal aperture is present in between the guard cells. Guard cells are not always surrounded by accessory cells or subsidiary cells.

49. (3)

Pruning is the process of cutting shoot tips to promote lateral growth of branches. Removal of shoot tips involves removal of apical buds. In the shoot tips auxins are produced. Auxins are growth promoting phytohormones. They cause apical dominance by promoting the growth of apical buds and suppressing the growth of axillary buds. So, when the auxins produced in the shoot tips are removed by decapitation it results in lateral growth and plants thus show bushy appearance.

50. (1)

Cytokinins have a specific effect on cytokinesis, which is the process of cell division and the formation of daughter cells. Cytokinins promote cell division and are involved in various aspects of plant growth and development, including the regulation of the cell cycle.

