Sample Paper- 04

Class 11th NEET (2024)

BOTANY

ANSWER KEY

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

Hint & Solution

1. **(4)**

(Order being higher category is the assemblage of families which exhibit a few similar characteristic. Dog (*Canis familaris*) and Cat (*Felis domesticus*) belong to two different families—Canideae and Felidae respectively.)

2. **(2)**

The class is the category of taxonomy, which is made up of one or more related orders like e.g., the class-Mammalia of animals includes all mammals either oviparous or viviparous. Taxonomic category like family includes related genera. For example Solanaceae includes a number of genera like Solanum, Atropa and Petunia and genera like tiger, lion leopard are included in family- Felidae. Spiecies is the basic category of taxonomy and also in evolution.

3. **(3)**

Plant families like Convolvulaceae, Solanaceae are included in the order Polymoniales mainly based on the floral characters.

4. **(1)**

Thylakoids are flattened membranous sacs forming the grana of chloroplasts. The other three options are incorrectly matched.

5. **(1)**

The name "club fungi" is given to basidiomycetes because of the presence of club-shaped basidia.

6. **(1)**

Somatogamy is the fusion of two vegetative/somatic cells of different strains or genotypes to form a dikaryotic cell.

7. **(3)**

A coenocytic hypha is a multinucleate hypha that lacks septa (crosswalls).

8. **(4)**

According to the six kingdom classification system proposed by Carl Woese, the six kingdoms of life are Archaebacteria, Eubacteria, Protista, Fungi, Animalia and Plantae.

Among these six kingdoms, Protista, Fungi, Animalia and Plantae belong to Domain Eukarya.

9. **(1)**

Plant classification proposed by Carolus Linnaeus was artificial because it was based on only a few morphological characters. Linnaeus's system relied on a limited set of observable characteristics to categorize plants, without considering their evolutionary relationships or underlying physiological and genetic differences.

10. **(2)**

Pyrenoids are present in chloroplasts of most green algae

11. **(1)**

CJD and BSE diseases are caused by Prions. Viroids are free, infectious and low molecular weight RNA molecules.

12. **(2)**

Elaters are present in the sporogonium of *Marchantia*.

13. **(4)**

Racemose inflorescence has an active growing point. It does not terminate in a flower. Hence, it is also known as indefinite or indeterminate inflorescence. It has acropetal (new flowers towards the tip and old flowers towards the base) and centripetal arrangement of flowers.

14. **(3)**

The statement "Post fertilisation development is like other algae" does not characterize red algae. Red algae have a unique post-fertilization development called the "carposporophyte" stage, which produces caprospores, which is distinct from other algae. Life cycle is complicated with post-fertilisation changes.

15. (1)
Bryophytes are known as 'amphibians of plant kingdom' because they are adapted to land as well as water habitats. In their vegetative structure, bryophytes have become adapted to land. But they depend on water for sexual reproduction because the swimming habit is retained by their male gametes, the antherozoids.

16. (2)
Bryophytes, like algae, have a thallus-like plant body structure, lack true vascular tissue (vascular strands), and are autotrophic.

17. (1)
Argemone and mustard, parietal placentation is present. In this condition initially the ovary is unilocular, but later on due to development of replum (false septum), it becomes bilocular.

18. (1)
In dicot seed, the seed coat is differentiated into two layers, viz., outer testa and inner is tegmen. In dicots the seeds are generally endospermic (with food reserve). Monocot seeds are generally non-endospermic.

19. (4)
In monocot leaf, mesophyll is not differentiated into palisade and spongy parenchyma. This differentiation is the characteristic feature of a dicot leaf.

20. (4)
In mango the pericarp is well differentiated into an outer thin epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp.

21. (3)
The correct statements from the given options are:
(a) In monocot leaf base expands into a sheath covering the stem partially or wholly.
(c) The lamina or leaf blade is the green expanded part of the leaf with veins and veinlets.
(d) Veins provide rigidity to the leaf blade.

22. (1)
Alternate phyllotaxy-*Hibiscus* (china rose), Opposite phyllotaxy-*Calotropis*, Whorled phyllotaxy-*Nerium*.

23. (4)
Whorled, simple leaves with reticulate venation are present in *Nerium*.

24. (3)
The plumule and radical in a monocot seed are enclosed in sheaths called "coleoptile" and "coleorhiza," respectively.

25. (3)
The correct statement for the gynoecium of Fabaceae is Superior ovary, monocarpellary, unilocular with many ovules.

26. (2)
Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

27. (4)
Periderm is not an example of lateral meristem. Periderm is a protective tissue that replaces the epidermis in older stems and roots of woody plants. It is composed of cork cambium (phellogen), cork (phellem), and secondary cortex (phelloderm). Cork cambium is responsible for producing cork cells, which form the outermost protective layer of woody stems and roots. While it is involved in lateral growth, it is not typically classified as a lateral meristem in the same way that fascicular vascular cambium and interfascicular cambium are.

28. (2)
Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

29. (3)
Collenchyma is not a modification of parenchyma. Collenchyma is a distinct type of plant tissue that provides structural support to young and growing plant parts, such as stems and leaves. It is characterized by its thickened cell walls, especially in the corners where cells are joined together. Collenchyma cells are elongated and often found in regions of the plant that are actively elongating.
The other options listed are indeed modifications or specialized forms of parenchyma:
Aerenchyma: This is a type of parenchyma tissue with extensive air spaces that facilitate the exchange of gases in aquatic plants.
Prosenchyma: Prosenchyma is a type of parenchyma where cells are elongated with tapering ends.
Chlorenchyma: This is a type of parenchyma tissue that contains chloroplasts and is involved in photosynthesis. It is commonly found in the mesophyll of leaves.

30. (2)

Marginal = Pea

(B) Axile = lemon

(C) Parietal = *Argemone*

(D) Free-central = *Primrose*

(E) Basal = Marigold

31. (1)

(A) Oxygen evolving complex ferric oxalate = Photolysis of water

(B) Proton gradient concentration = ATP synthase

(C) Absorb light at specific wavelengths = Pigments

(D) Photorespiration = High oxygen

32. (3)

a is Golgi apparatus, b is endoplasmic reticulum and c is mitochondrion.

33. (3)

Bud in the axile of leaf- simple leaf; Bud in the axile of leaflet- Compound leaf; Leaf turn into spines- Cacti; Leaves modify to catch insects- Pitcher plants; Fleshy leaves for storage of food- Garlic and onion bulb.

34. (2)

The smooth endoplasmic reticulum, or SER, is an organelle found in both animal cells and plant cells. Smooth ER consists of a long network of a folded, tube-like structure. The interior of the smooth ER is called the lumen, which is enclosed by a phospholipid membrane, just like the membrane that encloses the entire cell.

Functions of the SER include synthesis of carbohydrates, lipids, and steroid hormones; detoxification of medications and poisons; and storage of calcium ions.

35. (3)

Centrioles are primarily involved in organizing the microtubules during cell division. They form the basal bodies of cilia and flagella, and they play a crucial role in spindle fiber formation during cell division. Osmoregulation, on the other hand, is a function typically associated with cellular organelles like the cell membrane and vacuoles, not centrioles. So, option (3) is not a function of centrioles.

36. (4)

The duration of the cell cycle in human cells can vary depending on the type of cell and other factors. However, on average, the cell cycle of human cells typically takes about 24 hours, which is roughly equivalent to one day. So, the correct option is (4) 1 day.

37. (2)

Centromere split and chromatids separating is a characteristic feature of telophase, indeed it happens in anaphase.

38. (2)

The chiasma formation becomes visible during the diplotene phase of prophase I of meiosis I.

Chiasmata are the points of attachment between non-sister chromatids of two homologous chromosomes.

The actual "crossing-overs" of genetic material is thought to occur during the previous pachytene stage.

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40. (2)

The constancy of the chromosome number in a sexually producing generation is brought by the process of meiosis. As the number of chromosomes is halved during meiosis, this allows gametes to fuse during fertilization to form a zygote containing a mixture of paternal and maternal chromosomes. Thus, meiosis and fertilization facilitate sexual reproduction with successive generations maintaining the same number of chromosomes.

41. (1)

C4 photosynthetic pathway is more efficient than the C3 pathway because photorespiration is suppressed in C4 plants. So, both Assertion and Reason are correct and Reason us the correct explanation of Assertion.

42. **(1)**

Grasses (*Cynodon dactylon*) used for lawn need to be trimmed frequently as they show presence of intercalary meristem which helps them to elongate rapidly.

43. **(2)**

Robert Hill used *Chlorella* for proving that photosynthesis completed in two-phase i.e., light and dark phase. The curve showing the effectiveness of different wavelengths of light in photosynthesis was first given by Theodor Wilhelm Engelmann using all, except Unicellular green alga *Chlorella*. Theodor Wilhelm Engelmann was the first one who demonstrated the first action spectrum of photosynthesis. In his experiment he split sunlight into its spectral components (VIBGYOR) by using a prism and then illuminated green algae *Cladophora* placed in a suspension of aerobic bacteria. The sites of Oxygen evolution were detected by the bacteria.

44. **(1)**

When RuBisCO (Ribulose-1,5-bisphosphate carboxylase/oxygenase) acts as an oxygenase, phosphoglycerate and phosphoglycolate are produced. This process is known as photorespiration, and it occurs when RuBisCO binds with oxygen instead of carbon dioxide. Photorespiration is generally considered wasteful for plants because it does not result in net carbon fixation and can actually decrease the efficiency of photosynthesis.

45. **(1)**

The protons (H+ ions) formed by the splitting of water during the light-dependent reactions of photosynthesis are released into the lumen of the thylakoids. This is where the proton concentration gradient is established, which is used to generate ATP through chemiosmotic phosphorylation.

46. **(3)**

The seeds in which germination is stimulated in the presence of sunlight are known as positively photoblastic, whereas the seeds in which germination is inhibited in the presence of sunlight are called negatively photoblastic.

47. **(1)**

Glycolysis occurs in the cytosol and produces pyruvate, which in the presence of O2 enters the mitochondrion.

48. **(4)**

The complex V of the ETS of inner mitochondrial membrane is ATP synthase which is located in the head of an oxysome (F1 particle). It catalyses the conversion of ADP into ATP.

49. **(4)**

Z scheme of light reaction takes place in presence of PSI and PSII. Only PSI is functional in cyclic photophosphorylation. Cyclic photophosphorylation results into synthesis of ATP only. Stroma lamellae lack PSII as well as NADP reductase.

50. **(1)**

Plants show kranz anatomy are called CAM plants. Kranz anatomy means chloroplast is present in both bundle sheeth and mesophyll cell.