

PLANT ANATOMY AND PHYSIOLOGY QUESTIONS

1. Define these terms: (a) respiration (b) photosynthesis (c) transpiration (d) capillary action (e) diffusion (f) osmosis (g) active transport (h) passive transport.
2. What occurs at the cellular level when a plant grows?
3. Write a word equation for photosynthesis.
4. Describe several ways in which the rate of photosynthesis of a plant can be increased.
5. As the light intensity on a plant increases so does the rate of photosynthesis until it reaches a peak. However if the light intensity continues to increase, the rate of photosynthesis remains constant. Why?
6. A red object appears red because it reflects only red light when radiated with white light (White light is composed of red, orange, yellow, green, blue, indigo and violet light wavelengths). The red object absorbs all light except red. Deduce which light wavelengths are absorbed by green plants for photosynthesis.
7. In what forms can plants transport and store the carbohydrates produced in photosynthesis? Give examples.
8. Do plants respire? Explain.
9. Write a word equation for respiration.
10. Why do plants store carbohydrates?
11. Is it true to say that respiration is the reverse of photosynthesis? Explain.
12. In a leaf cross-section, describe the function of the : (a) cuticle (b) epidermis (c) mesophyll (d) stomata (e) guard cells (f) leaf veins.
13. Describe how a stomatal pore opens.
14. What is the advantage of stomates found on the underside rather than the upper side of the leaf?
15. How could you prove that oxygen is given off by green plants in photosynthesis?
16. It is recommended that gardeners water their gardens early in the morning for optimum growth. Why?
17. In what ways do the structures of Australian plants reduce their transpiration rates in our arid climate?

18. Apart from carbon, hydrogen and oxygen, name at least 5 essential elements obtained from the soil, and the function of each in the plant.
19. Name 2 elements required for the synthesis of chlorophyll, apart from carbon, hydrogen and oxygen.
20. The concentration of nitrates dissolved in the water in the soil is less than that in the plant sap. By what process are these nitrates absorbed into the roots?
21. Phosphates are not very soluble in water. The concentration of phosphates in the soil is far less than that in plant sap. How can this occur?
22. A farmer has a wheat crop that covers about ten hectares. The wheat plants in one corner of the crop are yellow-green in colour and about half the height of the rest of the crop which is green. Suggest a likely explanation for the yellow-green colour and poorer growth of the plants in the corner, and suggest how the farmer could improve them.
23. Describe the mutualistic relationship of fungi on roots of some plants (mycorrhiza).
24. What is the advantage of: (a) adventitious or secondary roots which branch off the tap or primary root (b) root hairs?
25. By what processes do water and nutrients taken into the roots move upwards through the stem to leaves?
26. What will happen and why if a green alga such as *Spirogyra* is placed into a solution of: (a) distilled water (b) very saline solution?
27. Only members of Phylum Tracheophyta are vascular.
 - (a) What is meant by the term "vascular"?
 - (b) State some types of vascular plants and some non-vascular plants.
28. Describe 2 differences between xylem and phloem vessels.
29. Describe the different ways in which xylem and phloem vessels are arranged in the stems of dicotyledons and monocotyledons.
30. What is cambium, and what is its function?
31. Differentiate between herbaceous and woody plants.
32. "Ring-barking" of trees was a common method used by early Australian settlers to clear the land. How does "ring-barking" kill trees?
33. What problems does a multicellular land plant face that are not faced by a multicellular marine plant? How are they overcome?

34. If cut celery stalks are placed into a red eosin dye solution, the dye becomes visible in the leaves the next day. However, if cut celery stalks are placed into Indian ink (a suspension of minute black particles) , the colouring matter does not reach the leaves. Explain.
35. When plants on a hot day wilt, they can be revived by watering. Why?
36. Flower farmers cut their flowers early in the mornings and immerse the cut ends immediately in a bucket of water. Why?
37. Suggest why it is that some plants die when the soil in which they are growing becomes waterlogged.
38. Explain what each of the following plant tropisms is: (a) geotropism (b) phototropism (c) thigmotropism.
39. List the different types of plant hormones, and state the effect of each on plants.
40. (a) What is meant by photoperiodism?
(b) What is meant by “long night”, “short night” or “indeterminate” plants?
(c) What is the function of phytochrome in plant cells?