

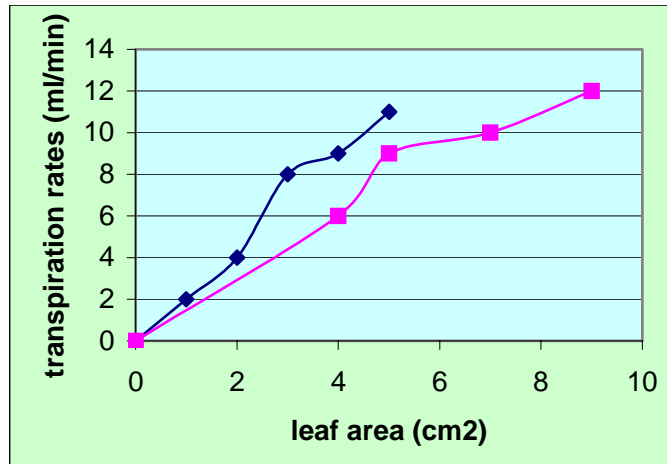
PROBLEM SET

SCIENCE

THEORY - II

1. Mercury is one of the inner planets, and its orbit is the smallest in the solar system. Explain using a diagram why it is difficult for us to see it
(3 points)
Answer:
2. The Sun looks red when it sets. Explain why!
(2 points)
Answer:
3. Total solar eclipse occurs more frequently than total lunar eclipse. However, more people have seen total lunar eclipse than total solar eclipse. Explain why!
(2 points)
Answer:
4. If the inclination of the Earth's rotation were 0° will the seasons on the Earth change? Show by a diagram
(2 points)
Answer:
5. The diameter of a crater on the Moon is $(\frac{1}{30})^\circ$. If the distance between the Earth and the Moon is 384 000 km, what is the linear diameter of the crater?
(3 points)
Answer:
6. Periods of revolution of Mars and Saturn around the Sun are 687 days and 29.5 years. How many degrees is the difference between their motions per day?
(3 points)
Answer:

7. Tuti conducted the experiment concerning the relationship between transpiration and leaf area in two different plants (plant A and plant B). She wrote the result of the experiment in a form of graph shown below.



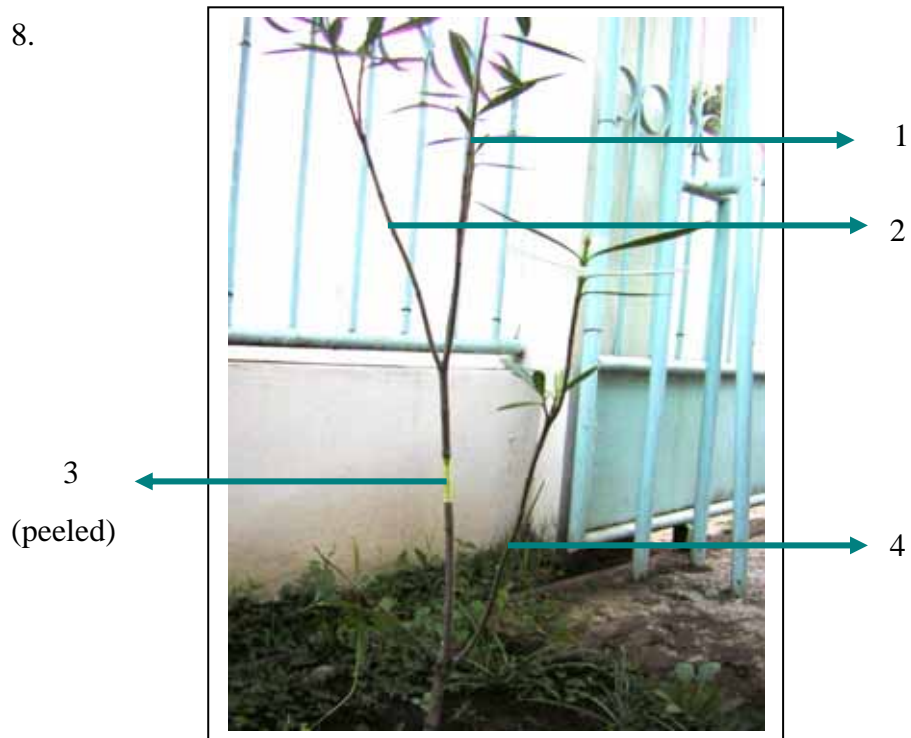
From the graph above:

- A. Explain how leaf's area influences the transpiration of plant A and plant B.
- B. Which plant respirates faster?

Answer:

(5 points)

8.



The figure above show plant ringed in part 3.

A. Do branch 1 and 2 will still alive? Give reason to your answer!

B. Does branch 4 still can get photosynthesis product from leaves in branch 1, 2? Give explanation to your answer.

Answer:

(4 points)

9. Donny conducts the experiment in the laboratory. He grows corn plants in two different environments. He sets up the plant A in an environment with low CO₂ and plant B in a high CO₂. He writes the result of his experiment as shown in a table below.

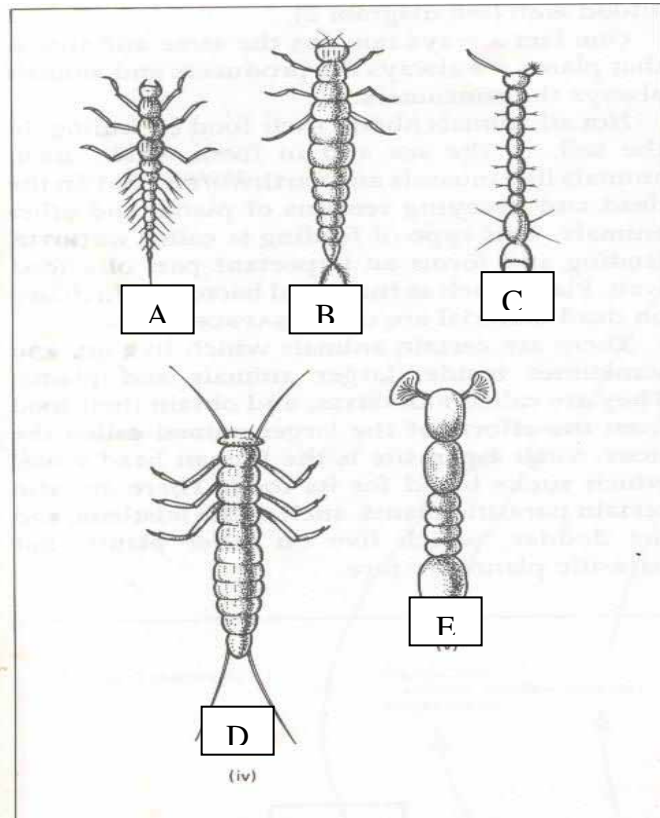
Times (week)	Growth rates (cm) (low CO ₂)	Growth rates (cm) (high CO ₂)
1	28	28
2	115	120
3	363	466
4	700	885
5	598	889
6	492	765

- A. Change the table above into a graph. Time on the horizontal axis and growth rates in the vertical axis
- B. How does carbon dioxide influence growth of the corn plants?
- C. Which plants has a higher growth rate?

Answer:

(5 points)

10. Look at the drawings 1 to 5 of the larvae of common freshwater insects (the drawing is not drawn to scale):



Identify each one in turn by using the key.

- 1) No legs go to no. 2
 Three pairs of legs present go to no. 3
- 2) Bristles on all segments *Culex*
 Bristles not present on all segment *Simulium*
- 3) One tail filament *Sialis*
 Two tail filament present go to no 4
- 4) Long filament on head *Perla*
 Short filament on head *Dytiscus*

Answer:

(5 points)

11. The table below shows the amount of nutrition calory and contain in food

Food	Calories Per 25 g (in joules)	Carbohy- drates (g)	Protein (g)	Fat (g)	Calcium (mg)	Vitamin C (mg)	Vitamin D (mg)
Bread	285 j	14,9	2,2	0,4	26	0	0
Margarine	945 j	0	0,1	24,2	4	0	11
Cheese	500 j	0	7,2	9,8	230	0	4
Potatoes	105 j	5,9	0,6	0	2	2,5	0
Tomatoes	33 j	1,9	0,3	0	17	57	0

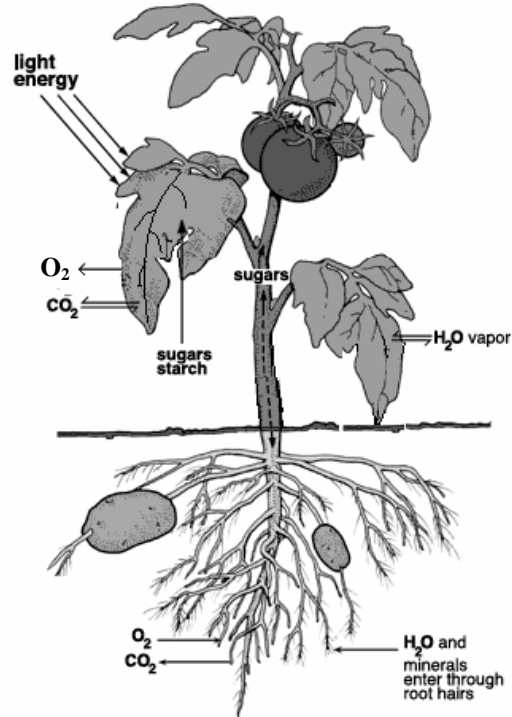
From the table above answer these following questions:

- A. Which food is the richest protein?
- B. Which food is a highest value in bone formation
- C. Which food would you recommend for someone suffering from aptha/mouth ulcer?
- D. How many calories would you obtain if you ate a cheese sandwich containing 100 g of bread, 50 g of cheese and 2,5 g of butter?

Answer:

(5 points)

Look at the following pictures! This picture shows the typical processes occurred in flowering plant. Answer the questions based on the picture!



12. Write down 2 plant's parts that have function as storage organs!

Answer:

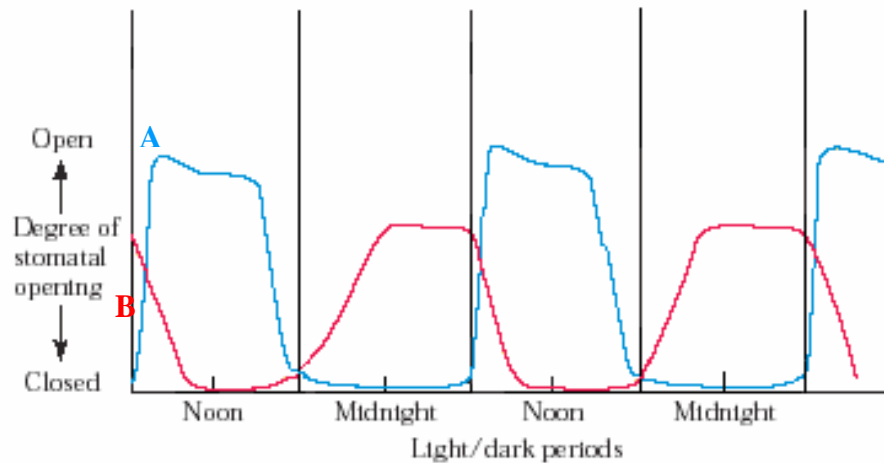
(2 points)

13. If some of the leaves are eaten by caterpillar, is the plant still produce storage organs? Give the reasons!

Answer:

(4 points)

The following picture illustrate the stomatal behavior in the two different plants during night and daylight.



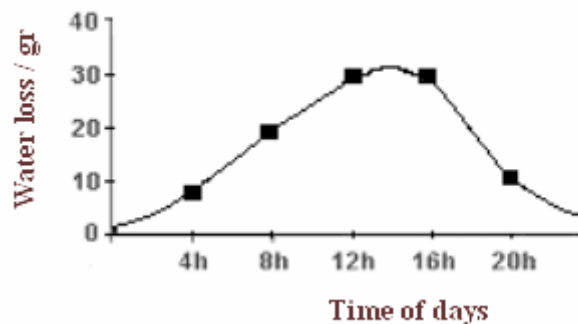
14. Explain the stomata's behavior in plant A and B based on the graph above!
Answer:

15. Give the reason why some plants open the stomata during the night, while it must be closed during the day?

(4 points)

Answer:

Plants lose water through their leaves by transpiration. The graph below is the result of transpiration experiment using *Hibiscus rosa-sinensis*. Answer the questions based on the graph!



16. When did the plant lose the most water and how much water evaporate from the plant?

Answer:

(point 2)

17. How do the plant lose the water?

Answer:
(point 2)

18. When did the plant lose the least water? Why?

Answer:
(point 2)

19. How can you explain these results?

Answer:

(point 2)

Science of the amphibian (no. 20 – 22)

Pandu is a little boy who loves playing with his father in the paddy field. The frog makes specific sounds during mating season and each species may have different songs. Frog songs are magic dominating the night sounds in the paddy field.

20. Why the frogs songs some time produces baritones or tenor sounds. The sounds may be very loud or very soft. Use your knowledge on the characteristics of sounds wave for explanation.

Answer:

2 points

21. Most frog species prefer to live in a wet-land or high humidity such as Paddy field. Explain why the frogs need high humidity?

Answer:

2 points

22. One day Pandu and his father may not find their favorite frogs anymore. Can you explain what the possibilities are? Use your knowledge from environmental science?

Answer:

2 points

23. Trees are important for human being and also for the existence of ecosystem. Would you write one example of how trees can be used by other organism so that this interaction gives benefit to human being.

Answer:

4 points

24. If you go to the supermarket to buy healthy foods, write down three prerequisites to decide that your food is healthy.

A. B. C.

Answer:

3 points

25. Explain what happens if somebody stab a persons' chest but do not wound his lung or heart? Answer the question based on your knowledge of breathing process.

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Answer:

2 points