18 (a) Light intensity, carbon dioxide concentration and temperature are all limiting factors in photosynthesis.

Explain what is meant by a **limiting factor**.

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..... **[2]**

Question 18(b) begins on page 20

(b) An investigation was carried out into the effect of adding different volumes of water on the survival of seedlings.

There were 60 seedlings in each group.

The results are shown in Table 18.

Volume of water added to soil (cm^3)	Day	Number of seedlings surviving
10	3	60
	6	59
	9	59
	12	58
	15	57
	18	57
20	3	60
	6	57
	9	54
	12	54
	15	54
	18	53
30	3	60
	6	58
	9	56
	12	50
	15	50
	18	48
40	3	60
	6	48
	9	40
	12	34
	15	26
	18	20
60	3	60
	6	41
	9	21
	12	6
	15	2
	18	2

Table 18

(i) Summarise the conclusions that can be drawn from these data.

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(ii)* Water can fill air spaces in the soil surrounding the roots.

This prevents oxygen from reaching root hair cells.

Using your knowledge of aerobic and anaerobic respiration, explain why overwatering can kill plants.

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(c) (i) Soluble mineral ions are present in soil.

Explain why water molecules can form hydrogen bonds with nitrate (NO_3^-) ions.

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(ii) Fig. 18 shows a process that occurs in the cell surface membrane of the endodermis in the root.

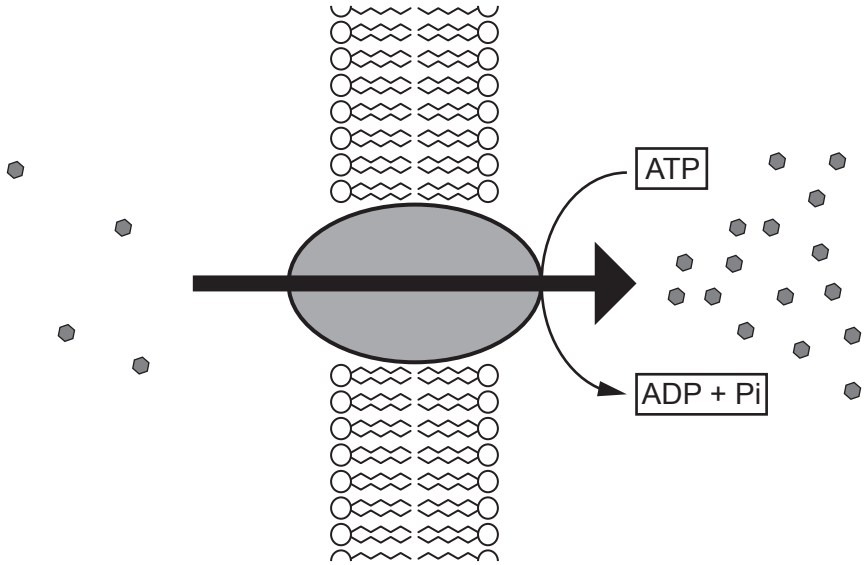

Fig. 18

Explain how the events shown in Fig. 18 cause water to enter the endodermis.

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(d) Explain why a plant leaf is described as an organ.

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