AS Level Biology A

H020/01 Breadth in Biology

Question Set 19

1. Plants need water to survive.

(a) Water enters plants through the roots. Most roots are covered in root hairs.

The number of root hairs per mm^2 of root surface is described as the density of root hairs.The density of root hairs can vary between and within species.

A scientist examined a plant root. The plant root had a diameter of 2 mm. In 1 mm of root **length** the scientist counted 440 root hairs.

Calculate the density of root hairs on the root the scientist examined.Use the formula:

Surface area of cylinder = $2\pi r(r + l)$

Give your answer to **2** significant figures.

density = ... **[3]**

(b) A scientist investigated the effect of different mineral solutions on root hair density on cressplants.

Cress plants were grown for seven days in two different mineral solutions, **A** and **B**.

The results are shown in the table below.

Cress plant	Root hair density (hairs mm^{-2})	
	Mineral solution A	Mineral solution B
1	42	25
2	53	41
3	60	32
4	52	34
5	38	58
6	48	27
Mean	48.8	
Standard deviation	8.0	

(i) Calculate the standard deviation of root hair density for cress grown in mineral solution **B**.

Use the formula: $s = \sqrt{\frac{\Sigma(x-\overline{x})^2}{n-1}}$

[Write your answer in the table] **[3]**

(ii) The scientist thought that mineral solution **B** might cause a reduction in root hair density.

Suggest an appropriate statistical test that the scientist could carry out in order to confirmtheir hypothesis.

[1]

(c) Fig. 24 is a section through xylem tissue from a **stem** of a dicotyledonous plant.

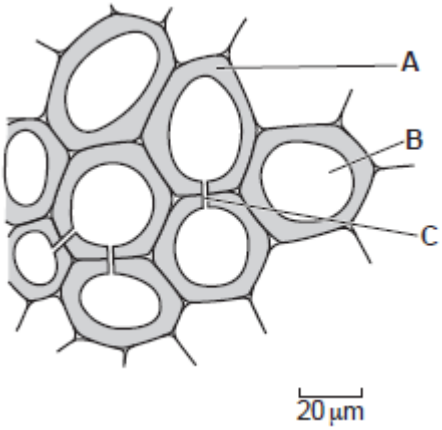

Fig. 24

(i) Identify **A**, **B** and **C** on Fig. 24.

A .....

B .....

C .....

[3]

(ii) Some plants, such as mosses, do not have xylem. Mosses are small plants that rarelygrow more than a few cm in height.

Suggest why mosses do not need structures such as roots or xylem to survive.

[1]

Total Marks for Question Set 19: 11

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