Oxford Cambridge and RSA

A Level Biology B

H422/01 Fundamentals of biology

Question Set 16

1. **(a)** **(i)** Abscisic acid (ABA) is a plant hormone that plays a role in many physiological processes.

Most ABA is produced in root hair cells and is carried in xylem tissue to the leaves.

ABA is transported to the xylem tissue via the apoplast pathway.

Describe this pathway.

[2]

(a) **(ii)** Some ABA is produced in leaves and is transported to the rest of the plant in phloem tissue.

The photomicrograph in Fig. 32.1 is a transverse section through a stem.

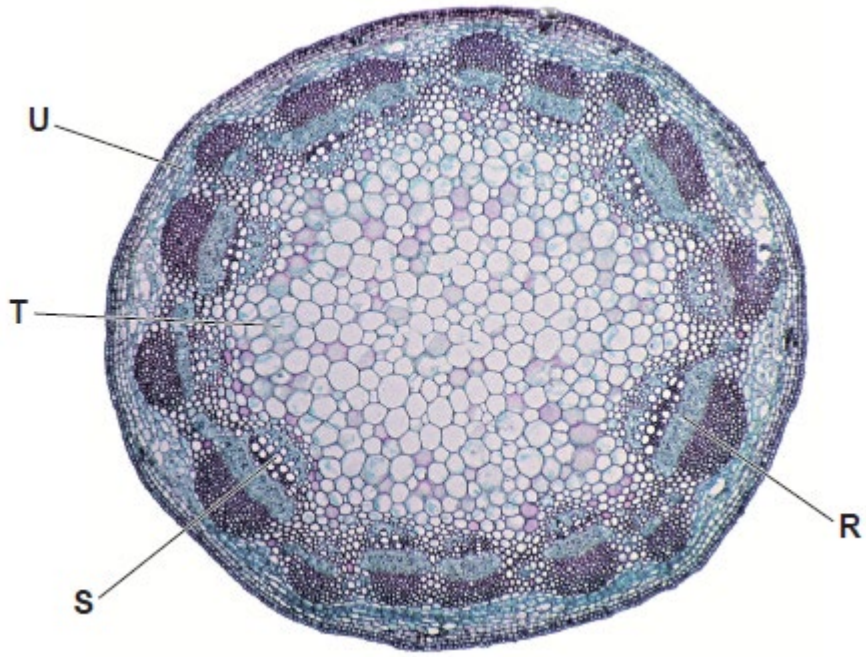

Fig. 32.1

State which letter, **R** to **U**, in Fig. 32.1, represents phloem tissue.

[1]

(a) **(iii)** Describe and explain **three** ways in which phloem tissue is adapted for the transport of sugars and other small molecules.

[3]

(b) ABA is known to promote the closure of stomata.

Binding of ABA to receptors on the surface of guard cells results in the removal of ions.

Explain how a loss of ions in guard cells causes the stomata to close.

[2]

(c) An experiment was conducted to investigate the effect of soil water potential on the production of ABA in leaves and the resistance to air flow through stomata.

The following parameters were measured daily in a maize plant:

- water potential of soil
- resistance to air flow through stomata
- ABA concentration in leaves.

Before the experiment, the plant was well-watered. The plant was not watered again until day 6 of the experiment.

The results are shown in Fig. 32.2.

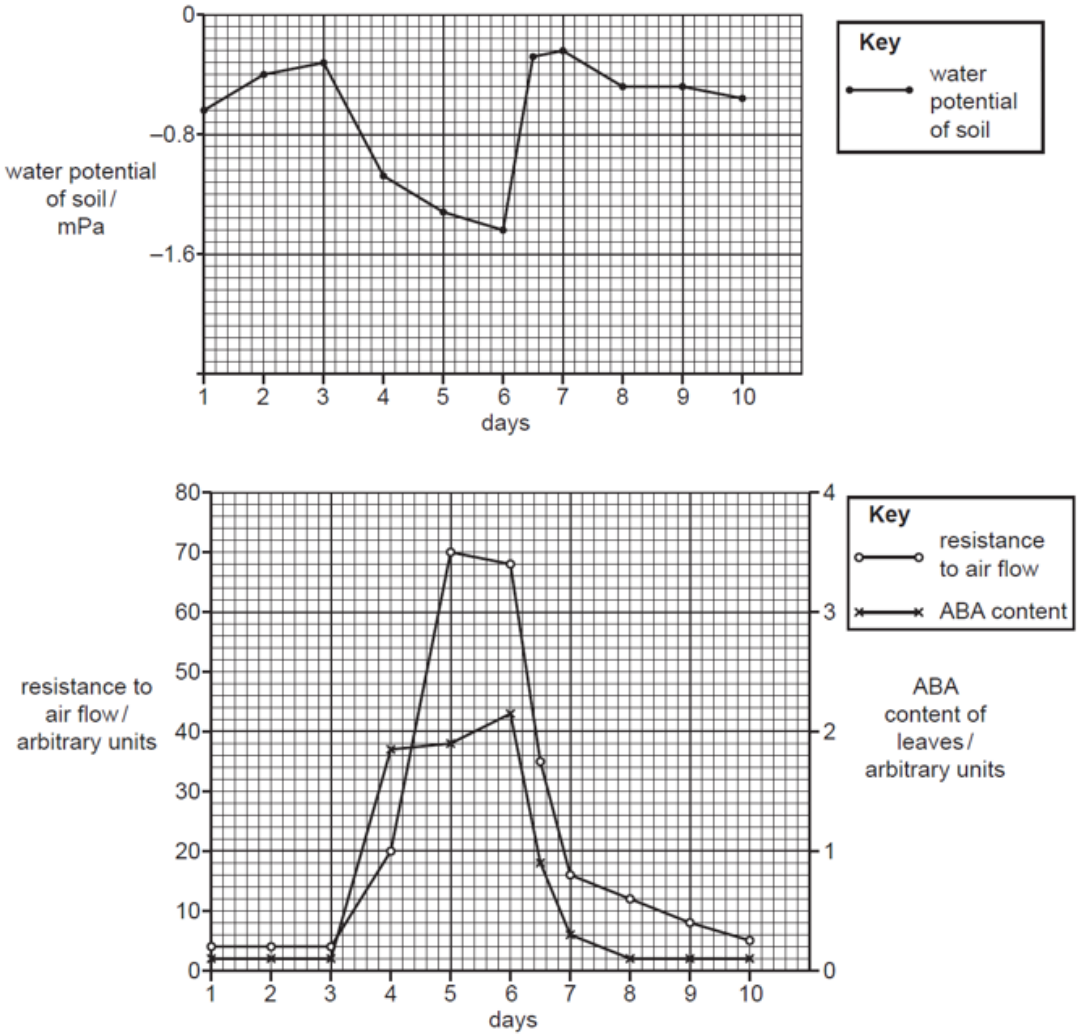

Fig. 32.2

The investigator made the following claim:

The data show that dry soil conditions promote the synthesis of ABA in maize plants, causing stomata to close.

Discuss the validity of this claim using **only** the data shown in Fig. 32.2.

[3]

Total Marks for Question Set 16: 11