CHEMISTRY ONLINE
TUITION

Phone: +442081445350

www.chemistryonlinetuition.com

Email:asherrana@chemistryonlinetuition.com

BIOLOGY

ORGANISMS RESPOND TO CHANGES IN ENVIRONMENTS

Level & Board	AQA (A-LEVEL)
TOPIC:	SURVIVAL AND RESPONSE
PAPER TYPE:	QUESTION PAPER - 2
TOTAL QUESTIONS	6
TOTAL MARKS	34

Survival and Response - 2

1.

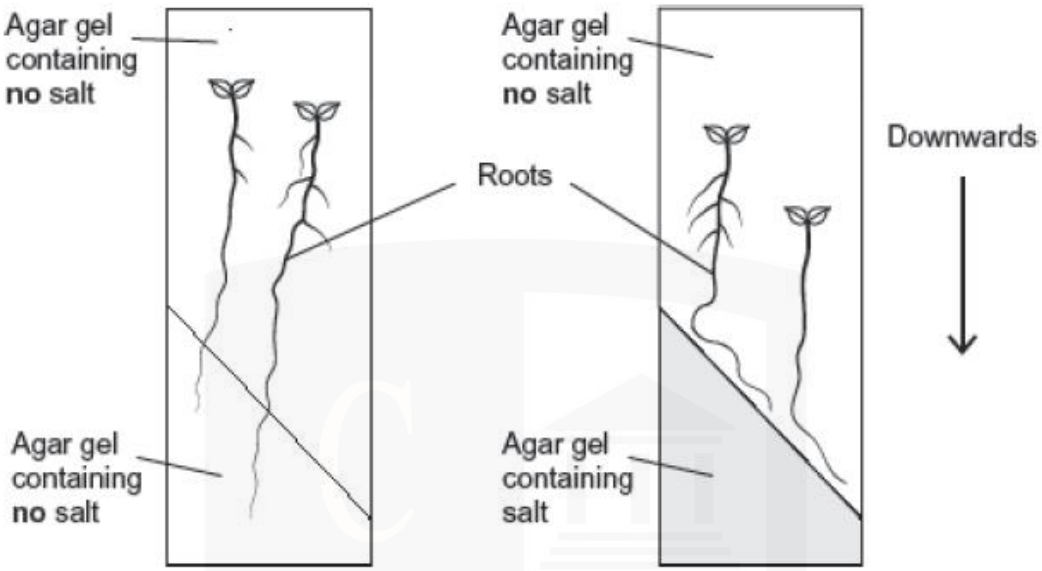
(a) Name one way that a cab and a tropism are alike and different. **(2)**

Researchers looked into tomato plant tropisms in their roots. As seen in Figure 1, they raised tomato plants from seeds on vertical agar plates. Each plate had an agar gel top that was devoid of salt. One of the following materials made up the bottom of each plate:

• salt-containing agar gel • agar gel without salt.

Figure 1 displays typical results for the growth of the roots.

Figure 1



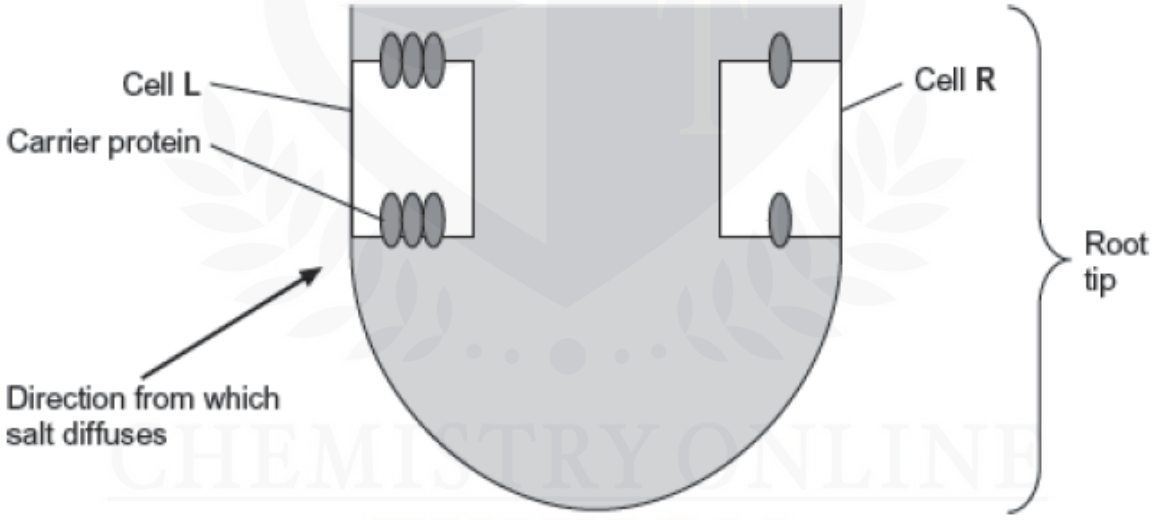
(b) What may be inferred from these findings regarding how tomato plant roots react to salt and gravity? **(3)**

(c) Tomato root tips contain a carrier protein that helps IAA exit the cells. High levels of IAA prevent tomato roots' cells from elongating.

According to the scientists' theory, salt modifies the amount of IAA carrier proteins present in cells located in various regions of the root tip.

Two cells, L and R, are depicted in the tomato plant's root tip in Figure 2.

Figure 2



Why would this root tip grow away from the salt? **(3)**

2.

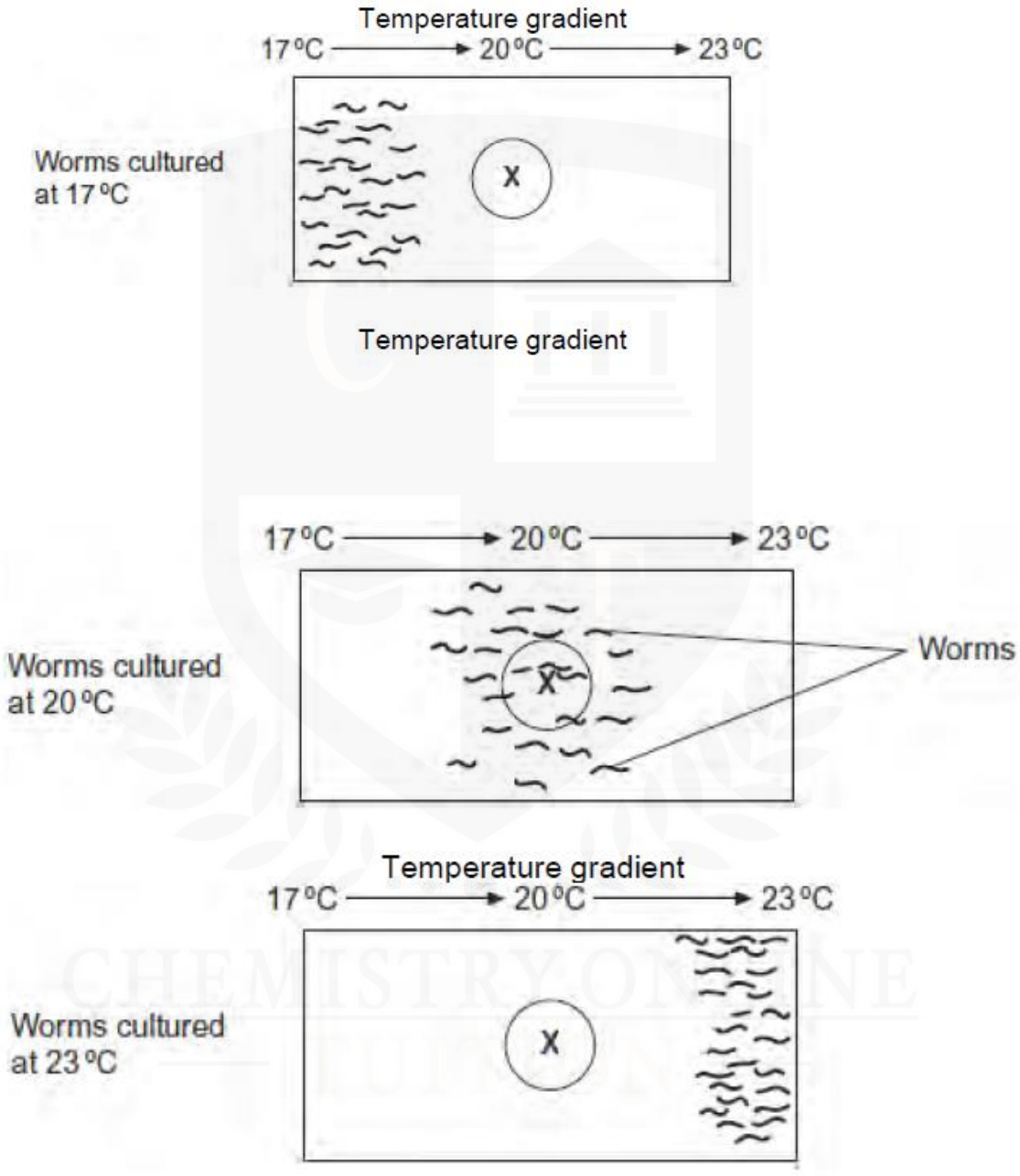
A biologist studied the behavior of a type of soil-dwelling worm.

For several days, he raised three different worm samples in three different soil trays. Every culture had a food source and maintained a distinct temperature.

The cultures were maintained at 17, 20, and 23 degrees Celsius.

After that, the biologist spent many hours removing food from the trays. Next, he placed every worm sample on a glass surface devoid of any food. There was a temperature gradient running across each surface. The researcher noted each worm's position after one hour.

The figure below shows his results. On each diagram, (X) marks where he released the worms onto the glass surface.



(a) The researcher came to the conclusion that the worms' actions showed signs of taxis.

How do these findings lend credence to this conclusion? **(2)**

(b) Provide a hypothesis about the worms' behavior on the glass surfaces when there isn't any food, based on the facts supplied. **(3)**

I am Sorry !!!!!

(c) To see where the worms traveled, the scientist in each experiment exposed the surfaces to even, weak light.

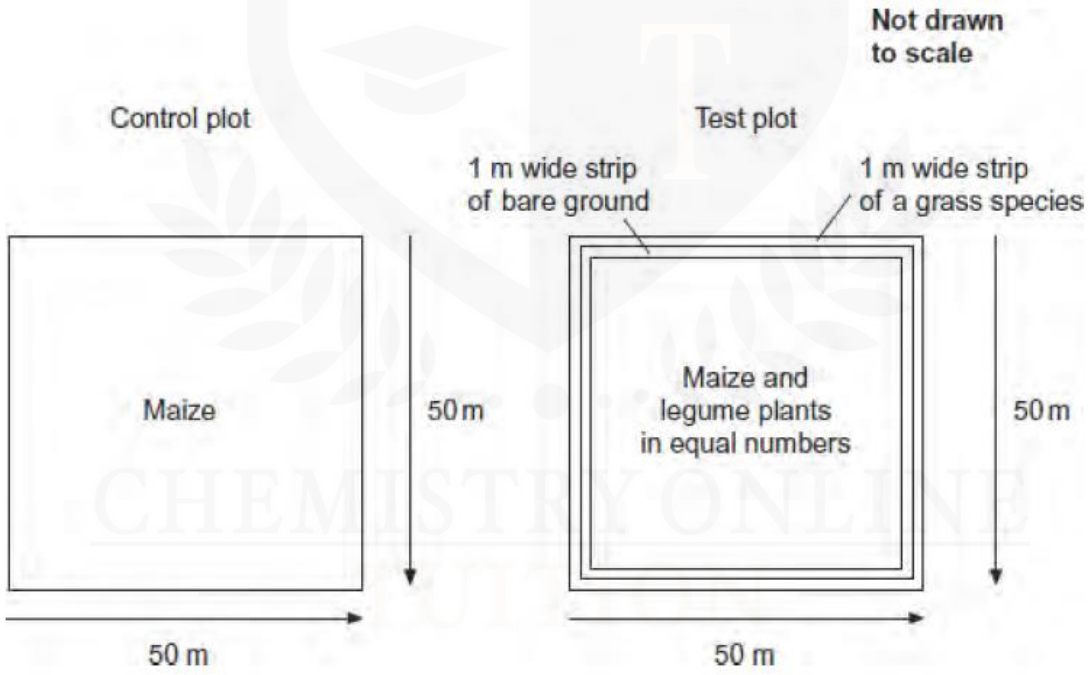
Provide two explanations for why it was crucial that the light be even and dim in addition to observing the worm movements. **(2)**

3.

Insect pests known as stemborers consume maize plants. Researchers looked into how push-pull cues affected the management of these pests.

The scientists partitioned a sizable field into 50 m × 50 m plots for this experiment.

Next, they labeled each plot as either a test or a control plot. What was planted in each kind of plot is depicted in the accompanying figure.



Stemborers are repelled by the legumes sown alongside the maize.

Stemborers are drawn to the type of grass.

The scientists findings are shown in the table below.

Plots	Mean percentage damage to maize plants	Mean maize grain yield / tonnes per hectare (± standard deviation)	Mean production costs per farmer / $ per hectare (± standard deviation)	Mean total income for farmer / $ per hectare (± standard deviation)
Control	29.6	1.5 (±0.2)	250 (±0.7)	329 (±5.9)
Test	6.7	3.7 (±0.3)	278 (±1.1)	679 (±10.2)

(a) Determine the push and pull stimuli in the test piece of land. **(1)**

(b) Sixty plants were randomly selected and evaluated from each test plot in order to calculate the mean percentage damage to the maize plants. Explain how a random selection of the maize plants could be made. **(3)**

(c) There was bare ground in the test plot in between the grass species and the maize. Provide a justification for this. **(2)**

4.

(a) On the roots of the legume plants are nodules that house bacteria that fix nitrogen. Describe how the growth of maize could be enhanced by nitrogen-fixing bacteria. **(2)**

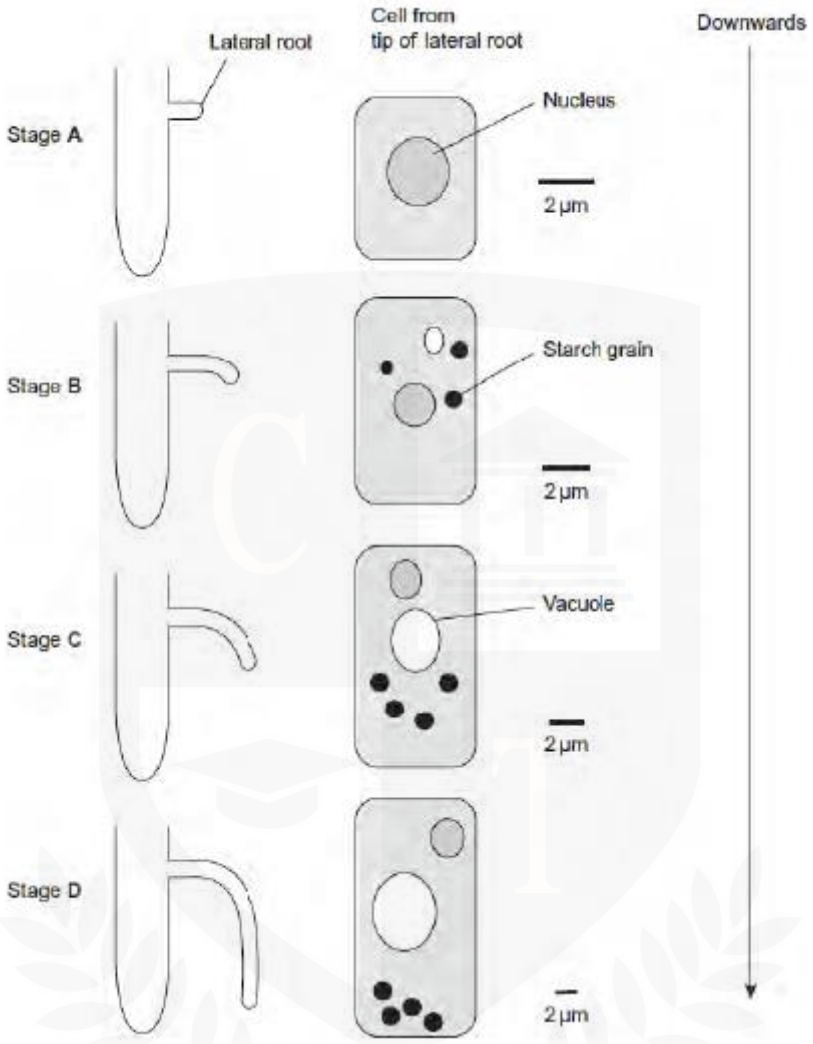
(b) One nation government opted to utilize these push-pull stimuli on its farmers a year following this investigation. How does this decision get supported by the data? **(3)**

5.

Researchers looked into how lateral roots reacted to gravity. The sides of the main roots give rise to lateral roots.

The diagrams depict the growth of a lateral root in four phases, A through D, along with typical cells from the tip of the lateral root at each step. Every single cell is drawn with its bottom facing the bottom of the page.

I am Sorry !!!!!



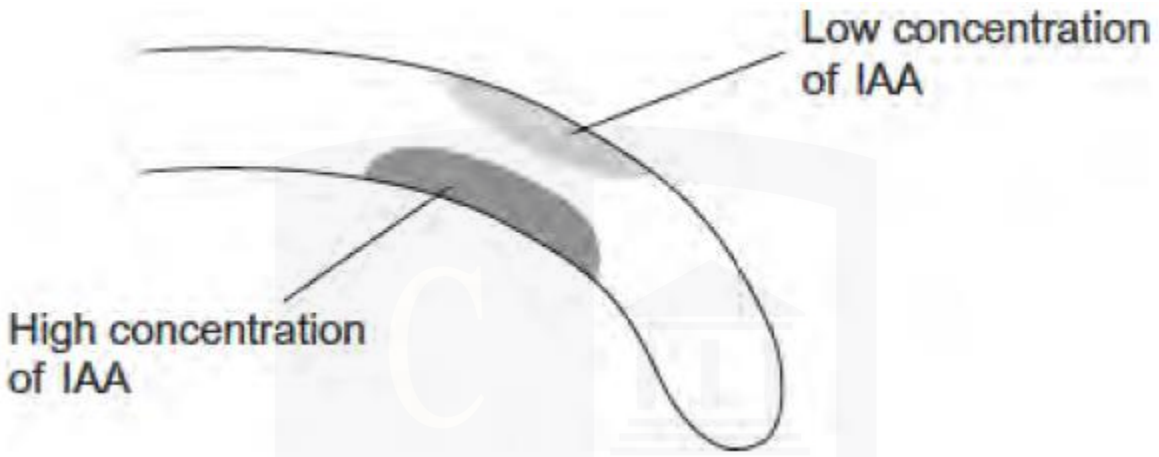
(a) List the three ways that the root tip cells differ from stages A to D. **(3)**

(b) The lateral roots bending and development direction were thought to be related to the starch grains in the root tip cells, according to the scientists' theory.

Does this theory make sense based on the facts in the diagram? Provide justification for your response. **(2)**

6.

(a) The distribution of indoleacetic acid (IAA) in the Stage B lateral root is depicted in the diagram.



Describe how the root bends as a result of this IAA distribution. **(3)**

DR. ASHAR RANA

M.B.B.S / MS. CHEMISTRY

CHEMISTRY ONLINE
TUITION
Phone: +442081445350
www.chemistryonlinetuition.com
Email: asherrana@chemistryonlinetuition.com

- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, Math's and Biology Tutor

CONTACT INFORMATION FOR
CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
- International Phone/WhatsApp: 00442081445350
- Website: www.chemistryonlinetuition.com
- Email: asherrana@chemistryonlinetuition.com

Address: 210-Old Brompton Road, London SW5 OBS, UK