AQA – Organisms respond to changes in their internal and external environments – A2 Biology P3

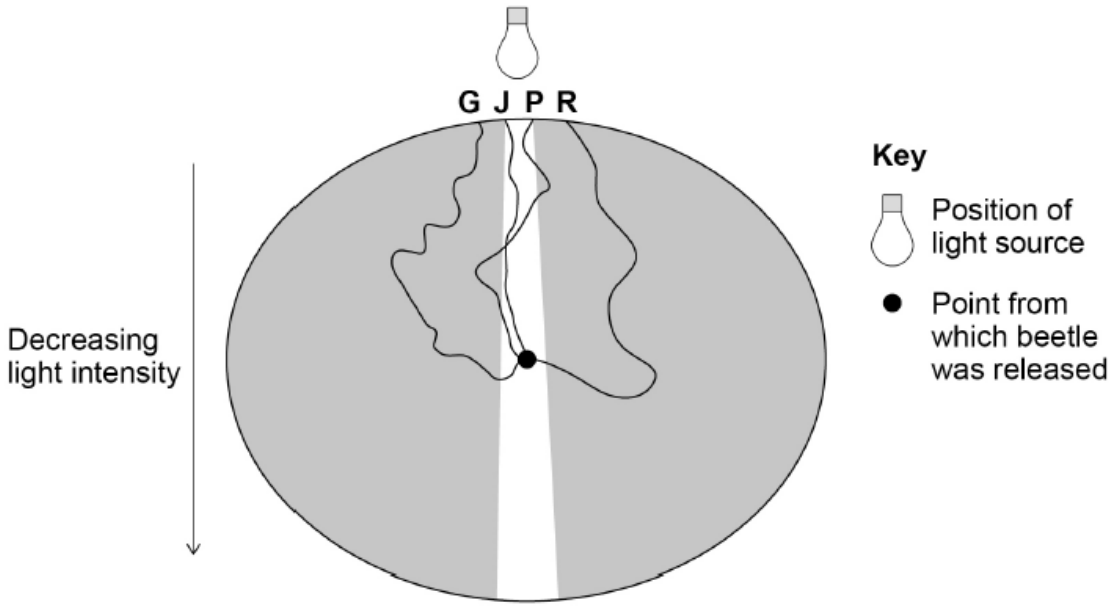
1. June/2021/Paper_3/No.3

0 3 Scientists investigated movement in adult pine beetles. Adult beetles emerge from cracks in tree bark.

The scientists released a newly emerged adult beetle, **G**, from the centre of a sample area that had a single light source coming from one direction. They made a drawing of the beetle's path of walking. They repeated this with three more beetles, **J**, **P** and **R**.

Figure 2 shows the scientists' results.

Figure 2



0 3 . 1 Name the type of behaviour shown by beetles **G**, **J**, **P** and **R**, and suggest **one** advantage to adult beetles of the type of behaviour shown.

[2 marks]

Behaviour _____

Advantage _____

_____

_____

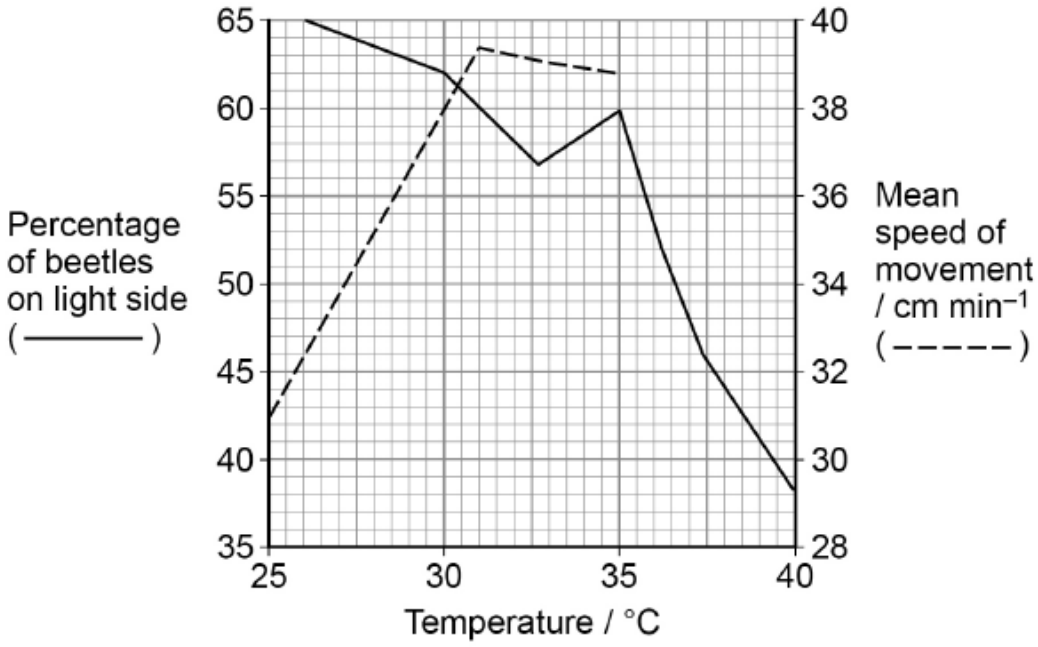
At higher temperatures and higher light intensities, adult pine beetles normally

- move more
- fly rather than walk.

When preparing to fly, these adult beetles walk slowly. The scientists investigated the movement of adult beetles at different temperatures, and in the light and the dark. They created a box that was half in the light and half in the dark. They released an adult beetle at the midpoint of the central dividing line between light and dark areas. They recorded the path of the beetle's movement and its location after 5 minutes. From this, they calculated the mean speed of movement. They repeated the experiment with many beetles and at several temperatures.

Figure 3 shows the scientists' results.

Figure 3



0 3 . 2 After studying these experiments, a student concluded:

- there is a significant change in movement between 35 °C and 37.5 °C
- between 35 °C and 37.5 °C, more beetles move away from the light
- between 35 °C and 37.5 °C, more beetles have a slower walking speed.

Suggest reasons why these conclusions might **not** be valid.

[3 marks]