

## Homeostasis and Exercise - Questions by Topic

Q1.

The photograph below shows Usain Bolt, an elite sprinter. He won a gold medal in the 100 metre final at the 2012 Olympic Games in a time of 9.63 seconds.



(a) The skeletal muscles of elite sprinters are likely to have many fast twitch muscle fibres. Suggest why these muscles are less red in colour than muscles with many slow twitch muscle fibres.

(2)

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(b) The pH of the blood of a sprinter falls during a race and returns to its original level after the race.

(i) State the homeostatic control mechanism that returns the pH of blood to its original level.

(1)

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\*(ii) Explain how the pH of the blood of a sprinter is returned to its original level after a race.

(5)

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Q2.

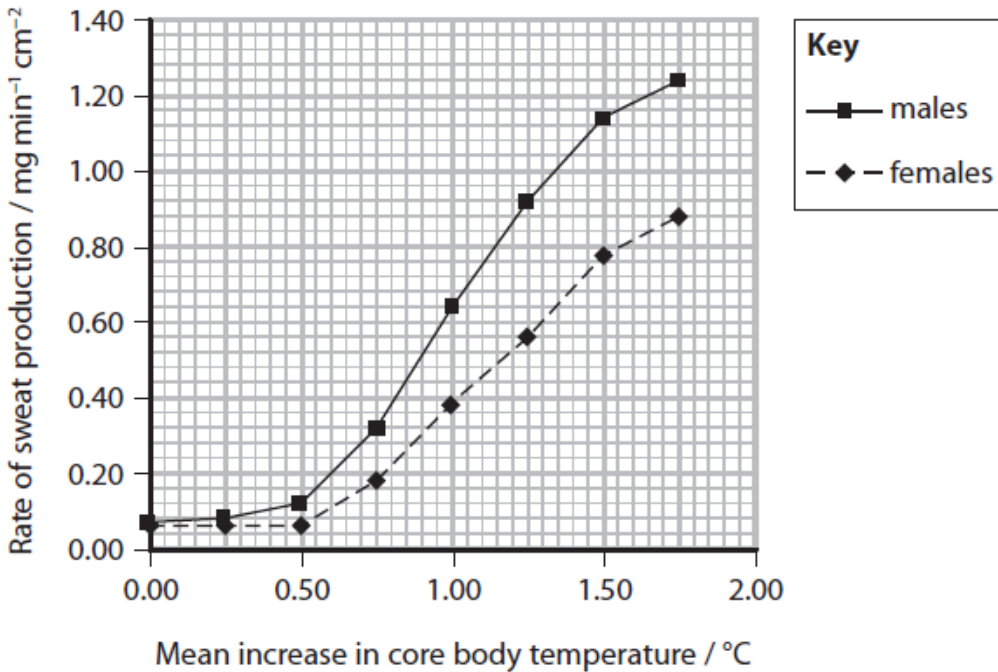
Athletic competitions often take place during the summer months when ambient temperatures are high.

High ambient temperatures affect marathon runners.

Heat stress occurs when the core body temperature rises above 40 °C.

Physical and physiological differences between males and females affect thermoregulation.

The graph shows the effect of a mean increase in body temperature on the rate of sweat production by males and females.



Female marathon runners have smaller bodies, with a larger ratio of skin surface to body mass than males.

Male marathon runners have less body fat than females: 5–11% compared with 10–15%.

Comment on how gender could affect thermoregulation in marathon runners.

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**(Total for question = 4 marks)**