

AS Level Biology A
H020/02 Depth in biology

Question Set 3

1. Bony fish and insects have different gas exchange systems. Both can be observed by dissection.
- (a) Describe how you would carry out the dissection to display maximum detail of either gas exchange system. [2]
- (b) Insects, such as beetles, obtain oxygen by drawing air in through holes in their exoskeleton, called spiracles. Pairs of spiracles on each abdominal segment connect to air tubes that take the air deep into the tissues of the insect for gas exchange.

Diving beetles live in ponds. They carry an air bubble under their wing when they swim underwater. The bubble supplies air to the spiracles. When the bubble has been used up, the beetle comes to the surface to collect a new bubble.

A student carried out an investigation into the effect of temperature on three diving beetles.

- Three beetles (A, B and C) from the same species were used in the investigation.
- They were placed in thermostatically controlled water baths at 10°C, 20°C and 30°C respectively.
- They were observed for one hour.
- The number of times the beetle surfaced to renew its air bubble was recorded.
- Mean values for each temperature were calculated and recorded to the nearest whole number.

The results are shown in Table 1.

Temperature (°C)	Number of times beetle resurfaced in one hour			
	Beetle A	Beetle B	Beetle C	Mean
10	10	12	8	10
20	18	22	18	20
30	44	48	38	43

Table 1

The student made an error in their working.

- (i) Put a ring around the error in **Table 1** and write the correct answer next to it. Use the space below to show your working.

[2]

(ii) Fig. 1 shows a diagram of part of the gas exchange system of an insect.

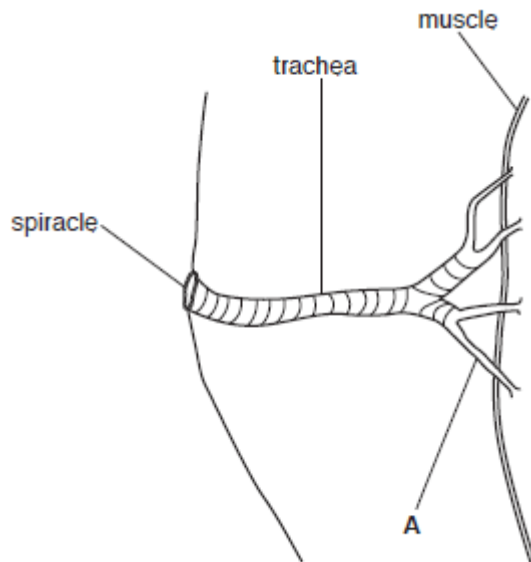


Fig. 1

Name the structure labelled **A**.

[1]

(iii) Describe how the trachea of a mammal is different from the trachea shown in Fig. 1.

[2]

(c)* Alveoli are located in the lungs of mammals.

Explain how **alveoli** are adapted for efficient gas exchange.

[6]

Total Marks for Question Set 3: 13

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