

A Level Biology B

H422/03 Practical skills in biology

Question Set 4

1. (a) (i) An investigation into the effects of ageing on reaction times was carried out using data from a longitudinal study of the same people over a period of time.
- A group of 25 people volunteered for a study in 1962.
 - As part of the study, the mean reaction time for each person was measured and recorded.
 - In 2012, ten of the same individuals were traced and volunteered to take part in a second study.
 - The mean reaction time using the same method was, again, measured and recorded.

Table 4 shows the results of the investigation.

Volunteer	Reaction time (10^{-3} s)	
	aged 18–25	aged 68–75
1	262	310
2	261	305
3	262	298
4	263	298
5	262	297
6	262	303
7	258	311
8	288	298
9	290	300
10	295	298
Mean	270	302
Median		
Range		

Table 4

Complete Table 4 by calculating the median **and** the range for both data sets.

[2]

- (a) (ii) Evaluate the usefulness of the mean **and** the median when carrying out statistical analyses.

[2]

- (a) (iii) Suggest **one** limitation of using the **range** in a statistical analysis.

[1]

(b) The investigators decided to perform a paired t -test on the data in Table 4.

Explain why a paired t -test is more appropriate than an unpaired (Student's) t -test for these data.

[2]

(c)* Laboratory experiments are often carried out to determine the effect of drugs on reaction times.

These experiments may be:

- longitudinal studies of the same animal species over time
- carried out using human subjects
- carried out using different animal species.

Discuss the ethical considerations of using humans **and** other animal species in laboratory experiments to determine the effect of drugs on reaction times.

[6]

Total Marks for Question Set 4: 13

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