

A Level Biology B

H422/03 Practical skills in biology

Question Set 12

1. (a) A student was asked to find out the glucose concentration in mock body fluids. The student was provided with **three** samples. The student's plan contained the following apparatus list:

- test tubes
- 5 cm³ syringes
- water bath set at 100 °C
- colorimeter fitted with a red filter
- cuvettes
- balance measuring in grams – 2 decimal place display
- filter papers and funnels
- table of data showing absorbance of 1, 5, 10 and 20 mmol dm⁻³ glucose solutions when tested with quantitative Benedict's reagent.

The student was given the choice of two methods, shown in Table 3.1.

Method 1 Benedict's reagent	Method 2 quantitative Benedict's reagent
<ul style="list-style-type: none"> • Add 5 cm³ of Benedict's reagent to a small volume of sample in a test tube. • Stand the test tube in boiling water for a few minutes. • Observe the colour change. <p>A colour change from green to yellow, then to brown and finally to red indicates the presence of reducing sugar.</p>	<ul style="list-style-type: none"> • Add 2 cm³ of quantitative Benedict's reagent (QBR) to 4 cm³ of sample in a test tube. • Stand the test tube in boiling water for 5 minutes. • Allow the tube to stand until the precipitate settles or filter to remove the precipitate. • Measure the absorbance using red light.

Table 3.1

The student chose to use method 2.

Give **one** reason why the student chose method 2.

[1]

(b)* Outline how the student could have used method 2 and the apparatus provided, to find out the glucose concentration in the samples of mock body fluids.

[6]

(c) A teacher was asked to comment on the method and results collected.

Complete the paragraph by choosing the most appropriate word from the list below.

- anomaly** **accuracy** **error** **limitation**
precision **repeatability** **reproducibility** **resolution**

The teacher suggested using a balance measuring in grams with a three decimal place display to improve.....After examining the results, the teacher concluded that the colorimeter had a zeroing error, limiting theof the results. The teacher stated that one of the investigation was that temperature was not controlled.

[3]

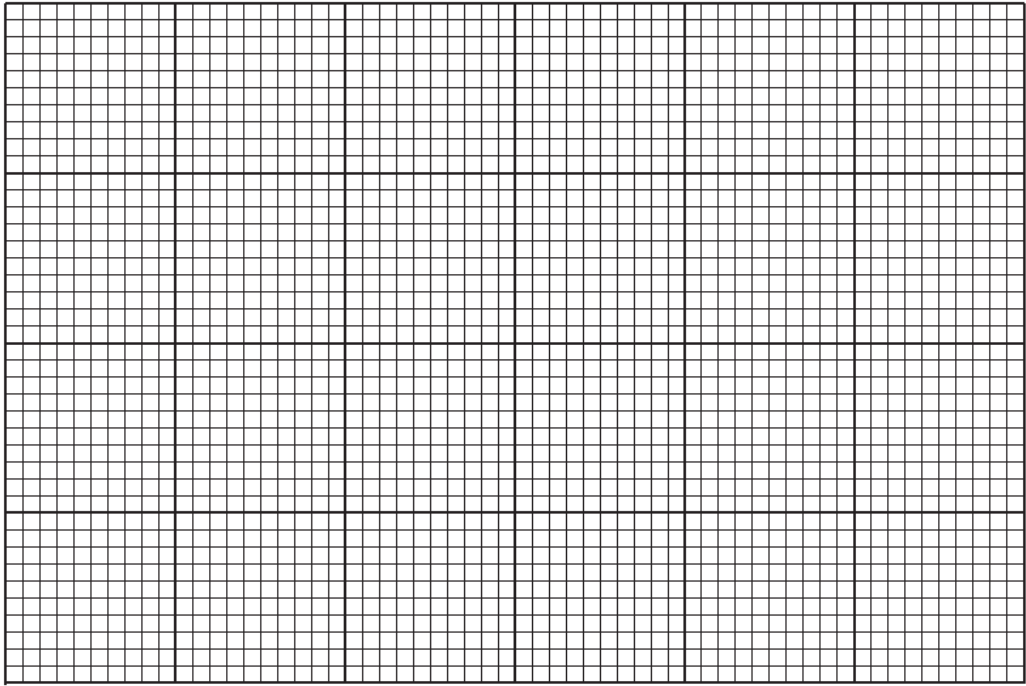
(d) (i) The results of a similar investigation are shown in Table 3.2.

Location of body fluid sample	Mean concentration of glucose (mmol dm⁻³)	Standard deviation
Bowman's capsule	15	2.0
Proximal convoluted tubule	4	0.7
Distal convoluted tubule	3	0.5

Table 3.2

Use the grid provided to present these data in the most appropriate way.

[4]



(d) (ii) A student concludes that these data came from a diabetic person.

Select **one** piece of evidence to support this conclusion.

[1]

Total Marks for Question Set 12: 15

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