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|---------------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre Number       |  |  |  |  |  | Candidate Number |  |  |  |  |
| Surname             |  |  |  |  |  |                  |  |  |  |  |
| Other Names         |  |  |  |  |  |                  |  |  |  |  |
| Candidate Signature |  |  |  |  |  |                  |  |  |  |  |

| For Teacher's Use<br>Total ISA mark |      |
|-------------------------------------|------|
| Section                             | Mark |
| Stage 1 Skills                      |      |
| Stage 2 Skills                      |      |
| Section A                           |      |
| Section B                           |      |
| TOTAL ISA Mark                      |      |



General Certificate of Education  
Advanced Level Examination  
June 2010

# Human Biology

# HBI6T/Q10/test

## Unit 6T A2 Investigative Skills Assignment

### Written Test

**For submission by 15 May 2010**

**For this paper you must have:**

- the Task Sheet, your results and your statistical test
- a ruler with millimetre measurements
- a calculator.

**Time allowed**

- 1 hour 15 minutes

**Instructions**

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 36.
- You will be marked on your ability to:
  - use good English
  - organise information clearly
  - use accurate scientific terminology.

Signature of Teacher marking this ISA ..... Date .....

**Section A**

These questions relate to your investigation into the effect of using one or two eyes on the perception of distance.

Use the Task Sheet, your results and your statistical test to answer them.

Answer **all** questions in the spaces provided.

- 1** You were told that the surface on which you worked should have nothing on it other than the small container used to catch the counter. Suggest why.

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(1 mark)

- 2** You were told to hold the counter at eye level but no precise height was specified. Is the height from which the counter was released important in this investigation? Explain your answer.

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(2 marks)

- 3 (a)** Increasing the number of repeats in an investigation usually increases the reliability of the results. Explain how.

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(2 marks)

- 3 (b)** In this investigation, increasing the number of repeats might actually reduce the reliability. Explain how.

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(2 marks)

- 4** Describe and explain **one** change in your experimental equipment which would give more accurate information about your ability to judge distances.

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(2 marks)

- 5** Most people find that using both eyes increases their ability to judge distance. Use your knowledge of visual perception to explain why.

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(2 marks)

**Turn over for the next question**

**Turn over ►**

- 6** A student carried out an investigation using the same method as you. The only difference was that she used volunteers from a large group of people of different ages. The student thought the different ages of the volunteers could be ignored. Do you agree? Give reasons for your answer.

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(3 marks)

(Extra Space) .....

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- 7** Another student divided a similar large group of volunteers into left-handed and right-handed people. For each group, he compared each volunteer's performance, at first with only the right eye open, then with only the left eye open. His hypothesis was that right-handed people do better with their right eye open than with their left eye open, and that left-handed people do better with their left eye open.

- 7 (a)** What was the null hypothesis for his investigation?

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(1 mark)

- 7 (b)** Use your knowledge of the structure of the visual system to explain his hypothesis.

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(2 marks)

**Turn over for the next question**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**

**Turn over ►**

## Resource Sheet

The information in the Resource Sheet is about perception of distance and the effects of drugs on responses.

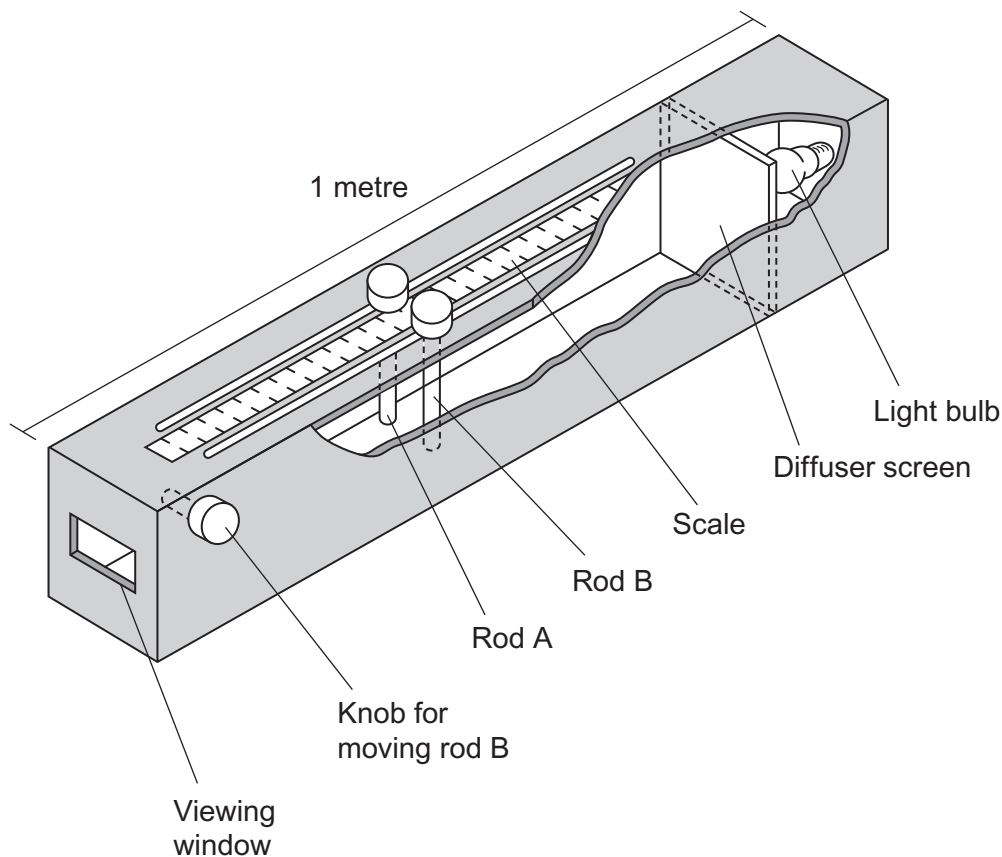
### Introduction

Driving a car involves visual perception and the ability to judge distances in different levels of light. It also involves eye-hand coordination involving the brain. Drugs such as alcohol and cannabis affect the ability to drive.

### Resource A

A scientist investigated the ability of volunteers to judge distances using one eye or both eyes. He also investigated the effect of different light intensities. **Figure 1** shows the apparatus he used.

**Figure 1**



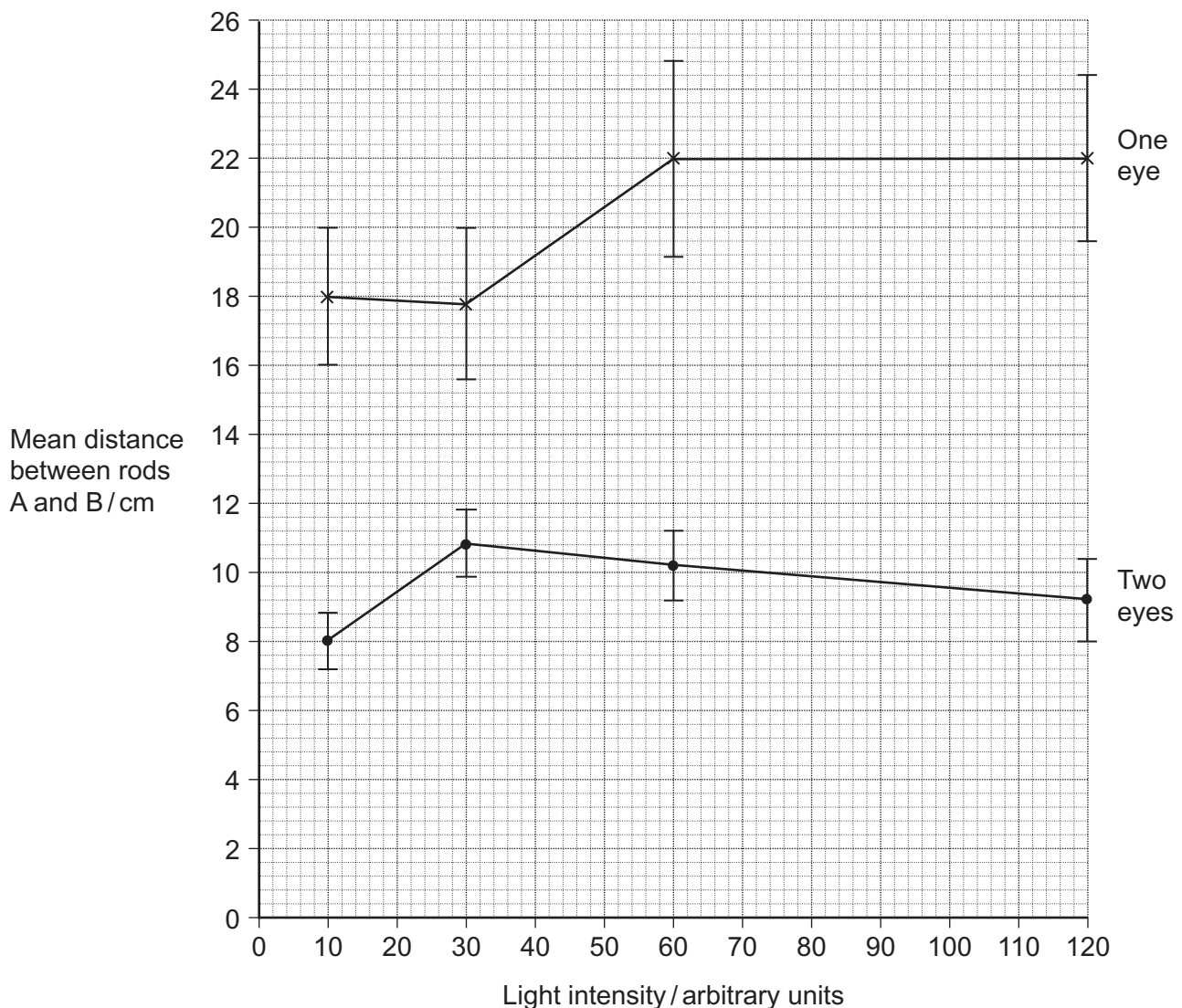
Before each trial, the scientist moved rods A and B so that they were not opposite each other. The volunteers sat in the dark for five minutes before a trial. They were then told to look through the viewing window with one eye closed. They then used the adjusting knob to move rod B until it appeared to be level with rod A.

After each trial, the scientist used the scale to record the distance between the two rods.

The volunteers repeated the trial with both eyes open. The experiment was also repeated using different light intensities.

The results of the investigation are shown in **Figure 2**. The bars show the standard errors.

**Figure 2**



Turn over ►

**Resource B**

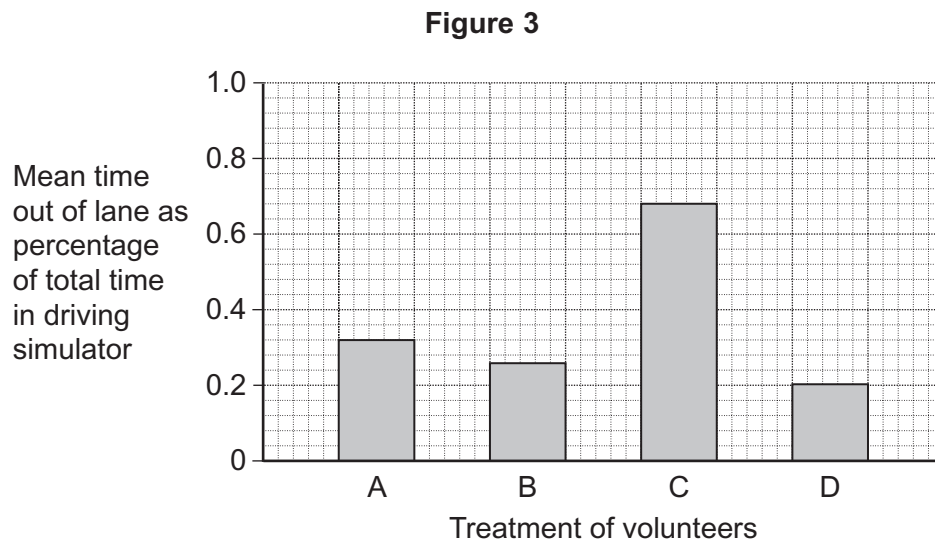
Scientists investigated the effects of a substance called THC on driving ability. THC is the main active ingredient of marijuana (dope). They recruited volunteers to do test drives in a driving simulator.

The volunteers were divided into four groups. Before driving, the volunteers in each group were given a drink containing one of the following.

- Group A were given THC
- Group B were given alcohol
- Group C were given THC and alcohol
- Group D were given water with neither THC nor alcohol.

During the test drive, the computer in the simulator recorded how long each volunteer spent out of the correct road lane.

**Figure 3** shows the results.





**Resource C**

Scientists investigated the effects of different concentrations of THC on the transmission of nerve impulses across a synapse. Their results are shown in the table.

| Concentration of THC /<br>moles dm <sup>-3</sup> | Percentage transmission<br>across the synapse |
|--|---|
| 0  | 100   |
| $1 \times 10^{-8}$                               | 85  |
| $1 \times 10^{-7}$                               | 59  |
| $1 \times 10^{-6}$                               | 50  |
| $1 \times 10^{-5}$                               | 44  |

**Turn over ►**

### Section B

Use the information in the **Resource Sheet** to answer the questions.

Answer **all** the questions in the spaces provided.

Use **Resource A** to answer questions **8** and **9**

- 8** What can you conclude from **Figure 2**?  
Explain your answer.

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(4 marks)

(Extra Space) .....

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**9** An investigator wanted to test the effect of alcohol on the ability to judge distance.

**9 (a)** The investigator used the box shown in **Figure 1**.  
Explain **three** factors she should have controlled in her investigation.

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(3 marks)

(Extra Space) .....

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**9 (b)** She considered testing **either**

1. two groups of people, one tested after drinking alcohol, and the other after drinking water
2. one group of people tested before and after drinking alcohol.

Give **one** advantage of testing

1. two groups of people .....
  - .....
  2. one group of people .....
  - .....
- (2 marks)

**10** In the investigation in **Resource B**, the volunteers were given doses of THC at  $200 \mu\text{g kg}^{-1}$  of body mass.  
Explain why the dose was calculated per kilogram of body mass.

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(2 marks)

Turn over ►

- 11** Using only the information in **Resource B**, a newspaper reporter wrote an article with the following headline: 'Alcohol and dope cause road death.'  
One scientist said that the results of this investigation were not sufficient to make this a valid conclusion. Suggest why the scientist said this.

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(4 marks)

(Extra Space) .....

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- 12** People who are going to drive are advised not to drink alcohol or take marijuana.  
Use appropriate information from the resources to explain this statement.

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(4 marks)

(Extra Space) .....

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**END OF QUESTIONS**