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|---------------|------------------|------|
| Centre Number | Candidate Number | Name |
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**BIOLOGY**

**5090/03**

Paper 3 Practical Test

May/June 2004

**1 hour 15 minutes**

Candidates answer on the Question Paper.  
No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen in the spaces provided on the Question Paper.  
You may use a soft pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **both** questions.

The number of marks is given in brackets [ ] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

| For Examiner's Use |  |
|--------------------|--|
| 1                  |  |
| 2                  |  |
| <b>Total</b>       |  |

This document consists of **8** printed pages, **3** blank pages and a Supervisor's Report.



- 1 You are provided with a wide test-tube and two beakers or cans. One of the beakers contains hot water for use as a water bath.

You are required to carry out an investigation and record your results in a table of your own design. Read the following procedure and construct your table in the space at the bottom of this page **before** you begin your investigation.

*Procedure*

- (a) Pour hot water from the beaker into the test-tube until it is two thirds full. Place the test-tube into the water bath and heat the water bath until the temperature in the test-tube is between  $56^{\circ}\text{C}$  and  $60^{\circ}\text{C}$ .

**Use your thermometer to make sure that the temperature is not higher than  $60^{\circ}\text{C}$ .**

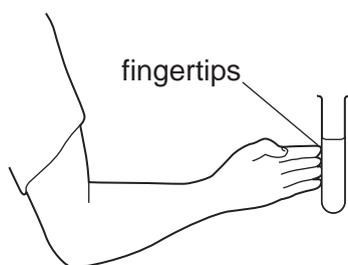
Carefully remove the test-tube from the water bath.

Turn off the bunsen burner or heater.

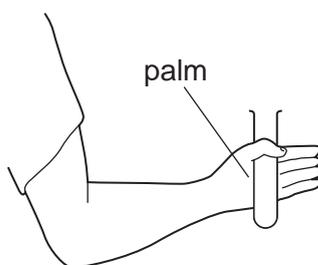
Place the test-tube against your finger tips as shown in Fig. 1.1.

Remember how hot the test-tube feels.

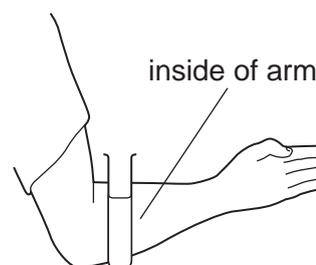
Now place the test-tube against the palm of your hand as in Fig. 1.2 and then against the inside of your arm as in Fig. 1.3.



**Fig. 1.1**



**Fig. 1.2**



**Fig. 1.3**

Make observations of how warm or cool the test-tube felt at each position. You may observe that:

- one position felt **warmer** than another,
- one position felt **cooler** than another.
- they felt the **same temperature**.

- (i) In the space below, construct a table to record your observations.

[3]

- (ii) Suggest an explanation for the results that you obtained.

.....  
 .....  
 .....[2]

- (iii) Explain how you ensured that the procedure was carried out safely.

.....  
 .....  
 .....[3]

- (b) Using the beaker of hot water from (a), add water or reheat the beaker until the temperature of the **hot water** is between 46 °C and 48 °C . **It must not be higher than 48 °C.**

Raise your hand. Your supervisor will then provide you with a beaker of **ice cold water**.

In the empty beaker, mix about  $\frac{1}{3}$  of the ice cold water with  $\frac{1}{3}$  of the hot water that you have just prepared. This will give a beaker of **warm water**.

- (i) Complete the table to show the temperature of the water in each of the three beakers.

|                | temperature of water / °C |
|----------------|---------------------------|
| ice cold water |                           |
| warm water     |                           |
| hot water      |                           |

[2]

- (ii) Place the first finger of your right hand in the ice cold water and the first finger of your left hand in the hot water as shown in Fig. 1.4. Keep your fingers in the water for **one minute**.

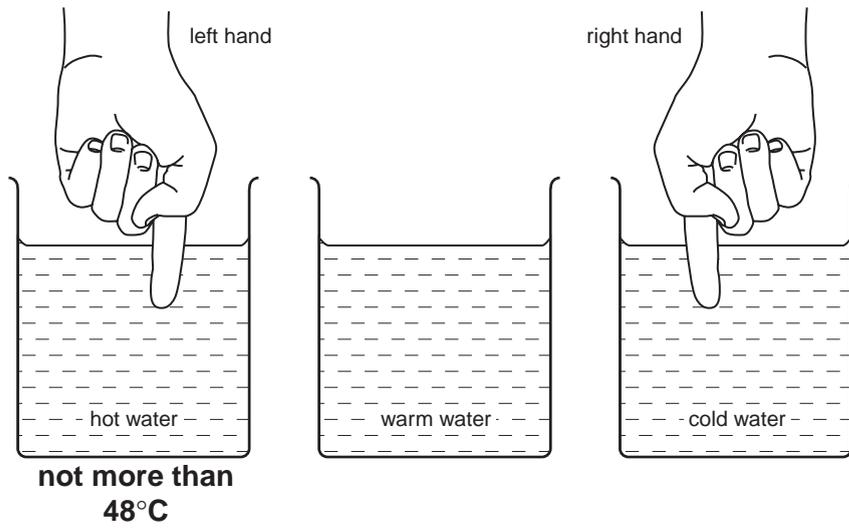


Fig. 1.4

After one minute, remove your fingers from both the hot and cold water. Immediately place them both together in the beaker of warm water as shown in Fig. 1.5.

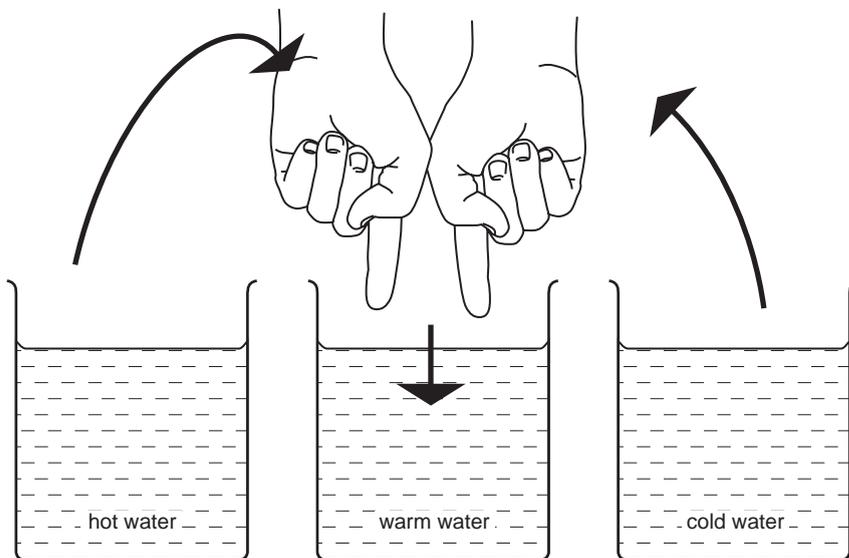


Fig. 1.5

Describe how the warm water felt to each of the two fingers.  
If you are uncertain, you may repeat the experiment.

*Right finger that went from cold water to warm water.*

.....[1]

*Left finger that went from hot water to warm water.*

.....[1]

**(iii)** Suggest an explanation for the observations that you have just recorded in **(b)(ii)**.

.....  
.....  
.....  
.....[1]

**(iv)** Suggest why it would be a good idea to repeat the experiment, only this time with the right finger going in the hot water and the left finger going in the cold water.

.....  
.....[2]

**(c)** Explain how your investigation could be extended to see if other parts of the body react in the same way as your fingers did in this investigation.

.....  
.....  
.....[2]

**(d)** Suggest why it is a good idea to use a thermometer when preparing a bath for a baby or an old person.

.....  
.....[1]

[Total : 18]

- 2** You are provided with two fruits labelled **S1** and **S2**.  
Using a sharp knife, carefully slit along the upper and lower edges of **S1**.  
Separate the two halves and keep the one that contains the most seeds.

Cut **S2** in half vertically.

Put one half of **S2** aside for use later in this question.

- (a) (i)** Complete Table 2.1 to describe three differences apart from colour that you can see between fruits **S1** and **S2**.

**Table 2.1**

| S1      | S2    |
|---------|-------|
| 1 ..... | ..... |
| .....   | ..... |
| 2 ..... | ..... |
| .....   | ..... |
| 3 ..... | ..... |
| .....   | ..... |

[6]

- (ii)** Carefully remove a seed from **S1**.  
Make **two** large, labelled drawings, each from a different view to show all the external features of the seed.  
Both the drawings should be to the same scale.

[4]

(iii) Determine the magnification of your drawings.

*length of seed* .....

*length of drawing* .....

*Show your working.*

*magnification* .....[3]

(iv) Carefully remove the outer coat from the seed **S1**.  
Separate the two halves of the seed.  
One half will have the embryo still attached.  
Examine this with a hand lens.  
Make a large, labelled drawing of this half.

[4]

- (b) (i) Remove a small piece of pericarp (fruit wall) from fruits **S1** and **S2**. Test each of these for the presence of starch and record your observations and conclusions in the table below.

|           | observation | conclusion |
|-----------|-------------|------------|
| <b>S1</b> |             |            |
| <b>S2</b> |             |            |

[2]

- (ii) It has been suggested that seeds from **S1** contain protein. Describe how you would carry out a test to show if this is true.

.....

.....

.....

.....

.....

.....[3]

[Total : 22]

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**SUPERVISOR'S REPORT**

*\*The Supervisor or Teacher responsible for the subject is asked to answer the following questions.*

- 1 Was any difficulty experienced in providing the necessary materials? If so, give brief details.
  
- 2 Did the candidate experience any difficulty during the course of the examination? If so, give brief details. Reference should be made to
  - (a) difficulties arising from faulty specimens;
  - (b) accidents to apparatus or materials;
  - (c) any information that is likely to assist the Examiner, especially if this cannot be discovered from the scripts.
  
- 3 The result of the test of a sample of pericarp (fruit wall) of **S1** and **S2** with iodine solution.

*Declaration (to be signed by the Principal, and completed on the top script from the Centre)*

The preparation of the practical examination has been carried out so as to fully maintain the security of the examination.

Signed .....

Name (in block capitals) .....

**\*Information that applies to all candidates need only be given once.**

N.B. If scripts are required by CIE to be despatched in more than one envelope, it is essential that a copy of the relevant Supervisor's Results (when requested), the Supervisor's Report and the appropriate seating plan are sent inside **each envelope**.