Write your name here

Surname	Other names

Pearson Edexcel
International
Advanced Level

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Advanced Subsidiary
Unit 1: Lifestyle, Transport, Genes and Health

Wednesday 21 May 2014 – Morning
Time: 1 hour 30 minutes

Paper Reference
WBI01/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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1/1/1/1/

P 4 2 9 2 0 A 0 1 2 4

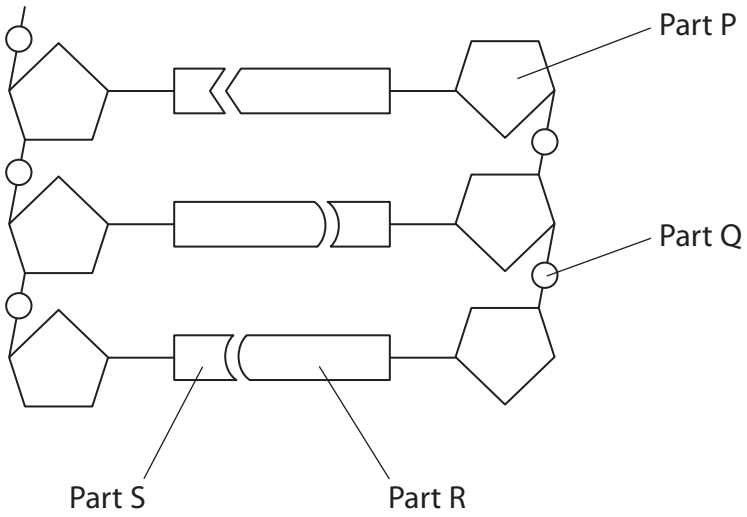
PEARSON

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Mononucleotides are involved in the replication of DNA.

(a) The diagram below shows a section of a DNA molecule.



(i) Place a cross ☒ in the box next to the part of this molecule that represents deoxyribose.

(1)

☒ **A** part P

☒ **B** part Q

☒ **C** part R

☒ **D** part S

(ii) Place a cross ☒ in the box next to the type of bonds that join part R and part S together.

(1)

☒ **A** glycosidic bonds

☒ **B** hydrogen bonds

☒ **C** peptide bonds

☒ **D** phosphodiester bonds

(iii) Place a cross ☒ in the box next to the parts of the molecule that are bases.

(1)

☒ **A** part R and part S only

☒ **B** part P and part Q only

☒ **C** part Q, part R and part S only

☒ **D** part P, part Q, part R and part S

(iv) Place a cross ☒ in the box to complete the following sentence.

If one of the bases in this DNA molecule is adenine, it will bond with

(1)

☒ **A** cytosine

☒ **B** guanine

☒ **C** thymine

☒ **D** uracil

(v) On the diagram of the section of DNA, draw a box round **one** mononucleotide.

(1)

(b) Describe the replication of DNA.

(5)

(Total for Question 1 = 10 marks)

2 Every time the heart beats, it goes through a series of stages. These stages are known as the cardiac cycle.

(a) (i) The table below shows the time taken for each stage of one cardiac cycle.

Complete the table with the name of each stage.

(2)

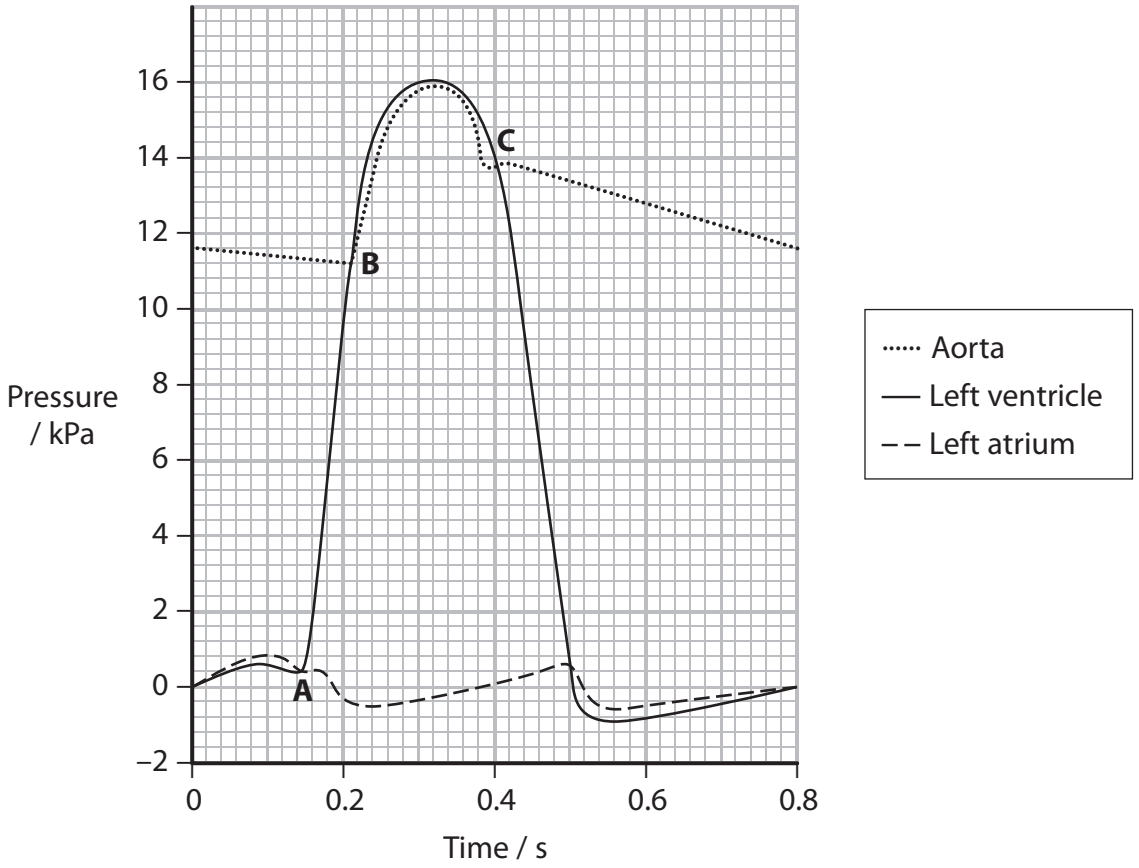
Stage of cardiac cycle	Name of stage	Time taken / s
Contraction of the atria		0.1
Contraction of the ventricles		0.3
Relaxation of both atria and ventricles		0.4

(ii) Using the information in the table, calculate the heart rate in beats per minute.

(2)

..... beats per minute

(b) The graph below shows the changes in blood pressure that take place in the left side of the heart and in the aorta, during one cardiac cycle.



(i) Using the information in the graph, state the maximum pressure in the left ventricle.

(1)

.....

(ii) At point **A**, the atrioventricular valve closes.

Explain the evidence from the graph which supports this statement.

(2)

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(iii) Describe what happens in the heart to bring about the changes shown at point **B** on the graph.

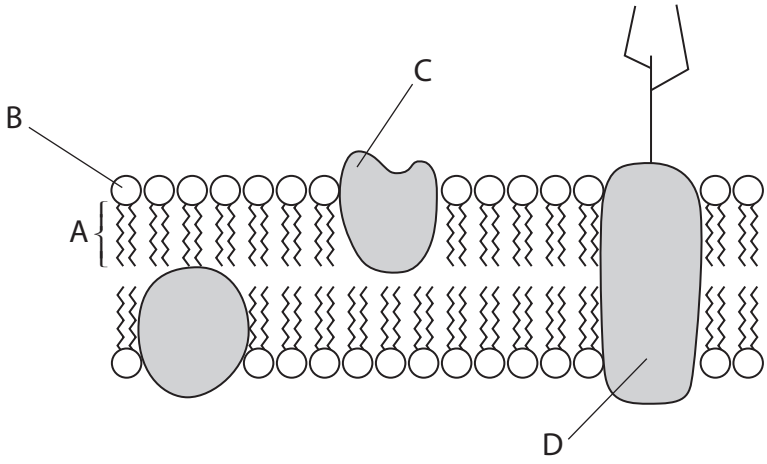
(2)

(iv) Explain why there are pressure changes in the aorta at **C** on the graph.

(3)

(Total for Question 2 = 12 marks)

3 The diagram below shows part of a cell surface membrane.



(a) (i) Place a cross ☒ in the box next to the part of the membrane that is a glycoprotein.

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(ii) Place a cross ☒ in the box next to the part of the membrane that contains **only** carbon and hydrogen.

(1)

☒ **A**

☒ **B**

☒ **C**

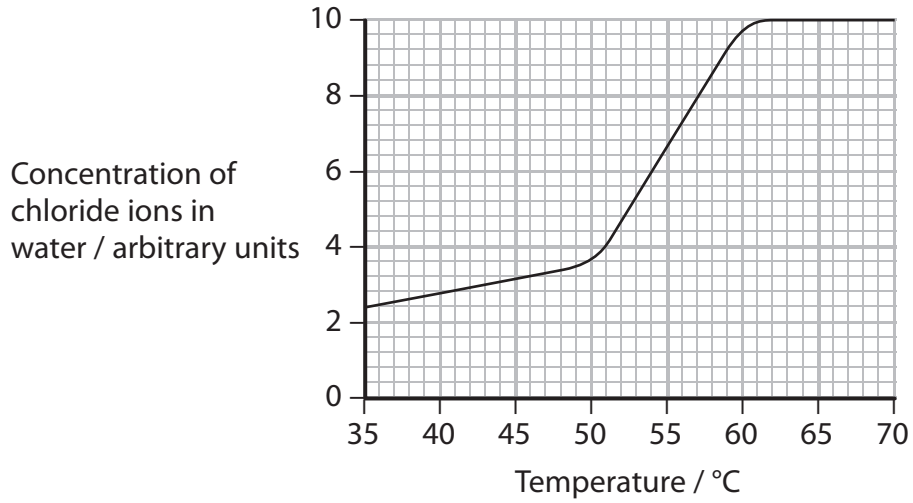
☒ **D**

(iii) Explain how the properties of the parts labelled **A** and **B** contribute to the structure of the cell surface membrane.

(3)

(b) When pieces of carrot tissue are placed in distilled water, chloride ions are released from the cells into the water.

The graph below shows the effects of temperature on the release of chloride ions from carrot cells.



(i) Using the information in the graph, describe the effect of temperature on the release of chloride ions from the cells of the carrot.

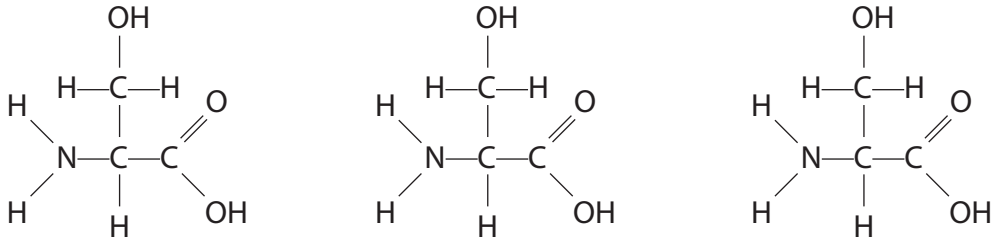
(3)

*(ii) Explain the reasons for the changes you have described.

(4)

(Total for Question 3 = 12 marks)

4 The diagram below shows the structure of three amino acids.



(a) (i) Draw a circle around each of the parts of these amino acids that would be removed when they join together in the formation of a protein.

(2)

(ii) Place a cross ☒ in the box to complete the following sentence.

In a protein, these three amino acids are joined together by

(1)

☒ **A** glycosidic bonds

☒ **B** disulphide bridges

☒ **C** hydrogen bonds

☒ **D** peptide bonds

(b) (i) State what is meant by the term **primary structure** of a protein.

(1)

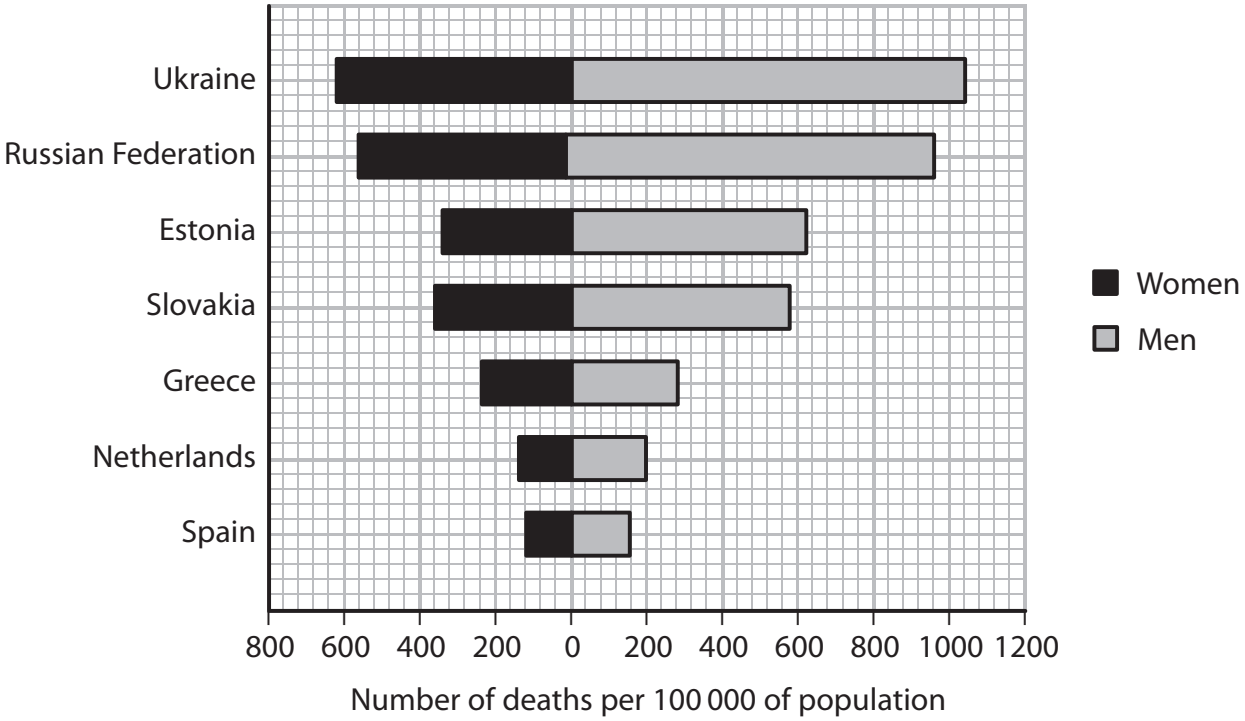
*(ii) Enzymes are proteins.

Explain how the primary structure of an enzyme determines its three-dimensional structure and properties.

(5)

(Total for Question 4 = 9 marks)

5 The bar graph below shows the number of deaths from cardiovascular disease (CVD) for some European countries in 2008.



(a) Explain what is meant by the term **cardiovascular disease**.

(2)

(b) Suggest why the deaths from CVD are expressed as the number of deaths per 100 000 of population.

(1)

(c) (i) Using the information in the bar graph, compare the number of deaths for men with the number of deaths for women.

(2)

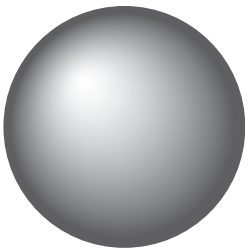
(ii) Suggest explanations for the differences in the number of deaths from CVD in these countries.

(4)

(Total for Question 5 = 9 marks)

6 The surface area of a single-celled animal is related to its volume.

A student used two spheres, A and B, to represent two different single-celled animals.

Sphere	Diameter / cm	Surface area / cm^2	Volume / cm^3
A 	3	28.27	14.14
B 	1	3.14	0.52

(a) The student calculated the surface area to volume ratio of sphere A as 2:1.

Calculate the surface area to volume ratio of sphere B.

(1)

Answer = ...

(b) Larger animals require a gas exchange surface, a respiratory system and a circulatory system.

(i) State **one** feature, other than a large surface area, of a gas exchange surface.

(1)

(ii) Explain why multi-cellular animals require a respiratory system and a circulatory system.

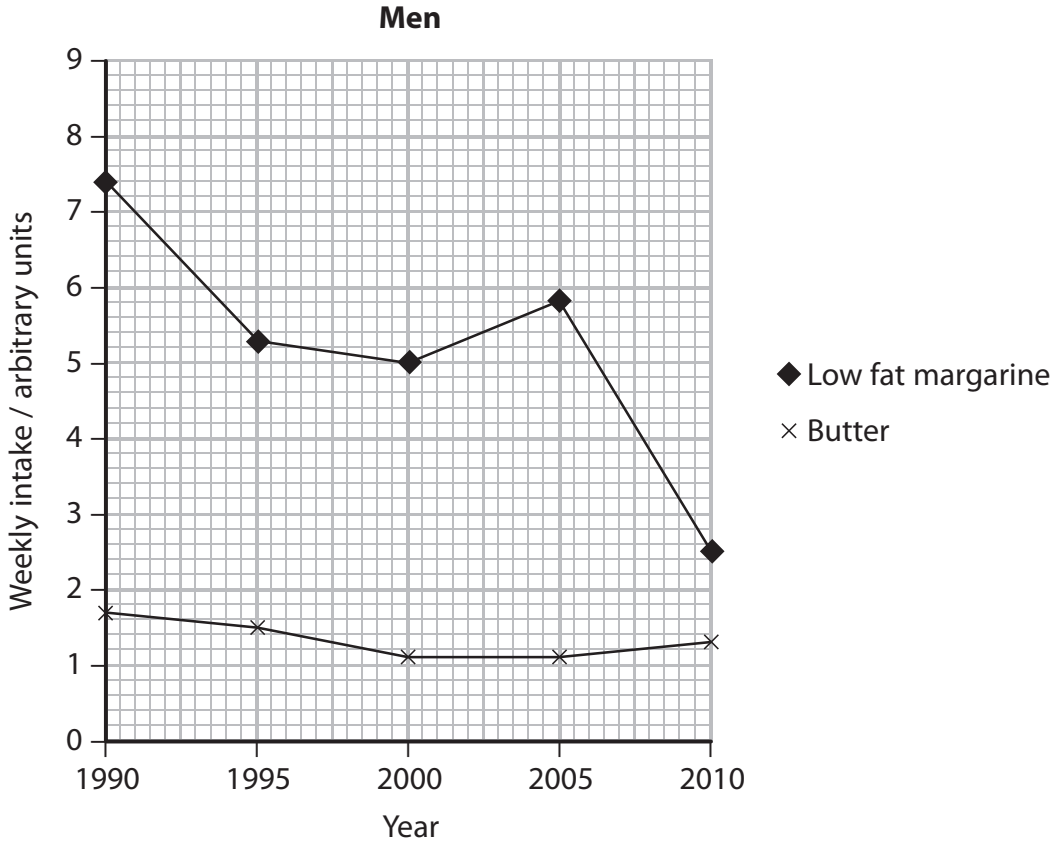
(4)

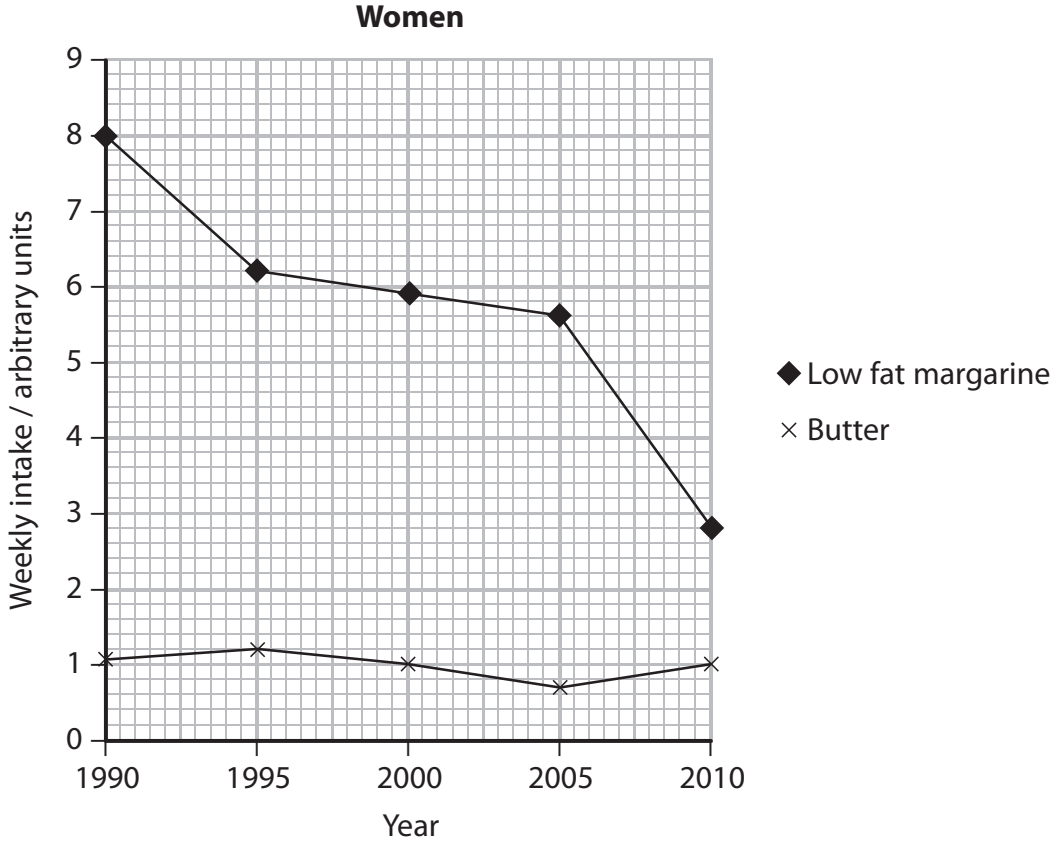
(Total for Question 6 = 6 marks)

7 Scientists studied the diets of a group of men and women in Northern Sweden.

People were asked to record their weekly intake of low fat margarine and butter.

Some of the results of this study are shown in the graphs below.





(a) (i) Using the information in the graph for **men**, describe the trends in consumption of low fat margarine and butter.

(3)

(ii) Using the information in both graphs, give **two** differences between the weekly intake of low fat margarine of men and women.

(2)

1

2

(b) (i) The scientists planned to continue the study with the same group of men and women.

Suggest **two** reasons why this was difficult to achieve.

(2)

1 .....

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2 .....

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(ii) The information in the graphs was collected using questionnaires that were completed at home.

Suggest **one** advantage and **one** disadvantage of using this method of data collection, rather than face-to-face questioning by the scientists.

(2)

Advantage .....

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Disadvantage .....

.....

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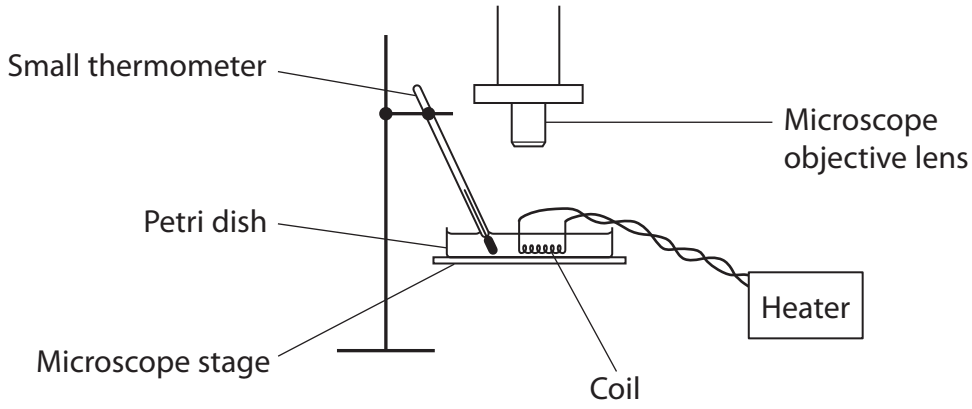
(Total for Question 7 = 9 marks)

8 A student investigated the effect of temperature on the heart rate of *Daphnia*, using the apparatus shown in the diagram below.

The student put one *Daphnia* into the Petri dish, which contained pond water at 20 °C.



(a) Suggest how the student should position the *Daphnia* and the thermometer in order to obtain valid results.

(3)

(b) Describe how the student should take counts of the *Daphnia's* heart rate at 20 °C to obtain reliable results.

(2)

(c) The student lowered the temperature of the pond water to repeat the experiment at 10 °C.

When the water reached 10 °C, the student waited for a few minutes before counting the heart rate.

(i) Suggest why the student waited for a few minutes before counting the heart rate at 10 °C.

(1)

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(ii) The student repeated the investigation at 30 °C.

Suggest why the student chose to do the 10 °C investigation before the one at 30 °C.

(2)

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(d) The student carried out this investigation at 10 °C, 20 °C and 30 °C using four different *Daphnia*. The student's results are shown in the table below.

Temperature / °C	**Mean heart rate / beats per minute**			
	Daphnia 1	*Daphnia* 2	*Daphnia* 3	*Daphnia* 4
10	82	85	93	128
20	92	96	93	155
30	178	180	190	260

(i) Using the information in the table, explain the effect of temperature on the heart rate of *Daphnia*.

(3)

(ii) The student decided not to carry out the investigation at 40 °C and 50 °C.

Suggest **two** reasons why the student decided not to carry out the investigation at these temperatures.

(2)

1

2

(Total for Question 8 = 13 marks)

TOTAL FOR PAPER = 80 MARKS

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