HOMEOSTASIS & NERVOUS SYSTEM TEST **Name: _____**

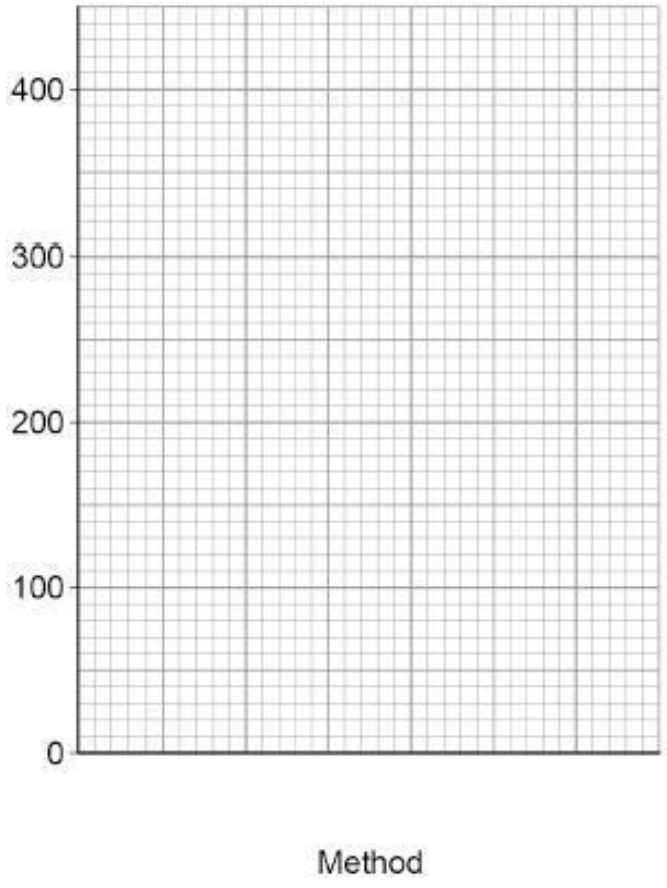
Q1. A student investigated the effect of either **seeing** a stimulus or **hearing** a stimulus on reaction time. **The Table** shows the results.

Method	Mean reaction time in milliseconds
Seeing the stimulus	350
Hearing the stimulus	220

(d) Complete the figure below. REMEMBER TO TICK OFF THE BULLET POINTS.

You should:

- plot the data from the **Table above** as a bar chart
- label each bar
- label the y-axis. **(2)**



(e) Compare the reaction time when seeing the stimulus with the reaction time when hearing the stimulus.

_____

_____ **(1)**

Q2. Homeostasis is the control of internal body conditions.
Control of body temperature is an example of homeostasis.

(a) Draw **one** line from each part involved in temperature control to the function of that part. (3)

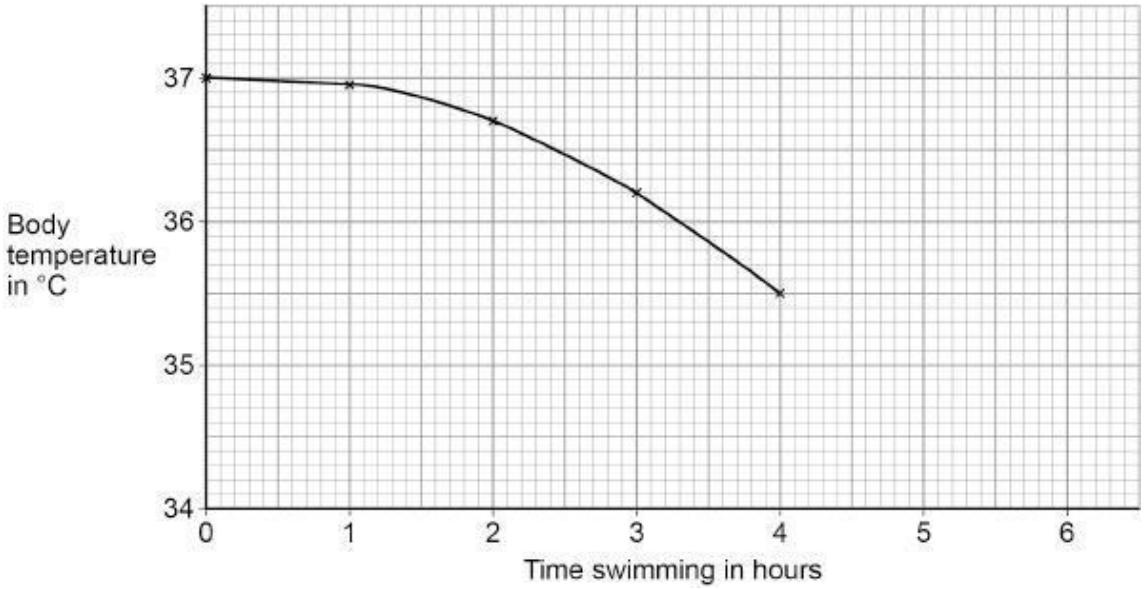
Part involved in temperature control	Function
Brain	Changes air temperature outside the body
Muscle	Contracts to increase body temperature
Receptor	Coordinates information about body temperature
	Detects changes in skin temperature

(b) Why is homeostasis important? Tick (✓) **two**. (2)

- To allow **cells** to function properly ☐
- To change body **temperature** to match air temperature ☐
- To decrease **water** levels in the body throughout the day ☐
- To maintain the optimum conditions for **enzymes** ☐
- To prevent reactions inside **cells** ☐

The body temperature of a long-distance swimmer can change with the length of time swimming in cold water.

The figure below shows how the body temperature of one swimmer changed in the first 4 hours of a 6-hour swim.



(c) Describe the trend shown in the figure above.

_____

_____ **(1)**

(d) Determine the change in body temperature in the first 4 hours of the swim.

_____

Change in body temperature = _____ °C **(2)**

(e) Hypothermia is a dangerously low body temperature of 35 °C or colder.

Predict when the swimmer was **first** at risk of hypothermia.

You should **extend the line** on the figure above.

Prediction = _____ hours **(2)**

Swimming in cold water decreases the insulin concentration in the blood.

(f) Complete the sentence. Choose from **heart** **pancreas** **stomach**

Insulin is produced by the _____ **(1)**

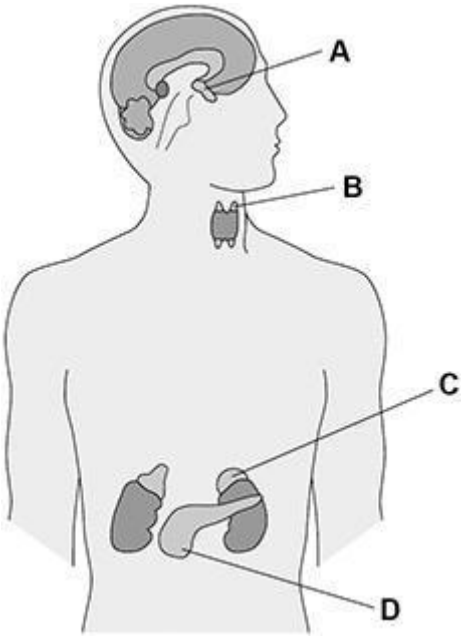
(h) Complete the sentence. Choose from: **decrease** **stay the same** **increase**

When insulin concentration in the blood increases, blood glucose concentration will _____. **(1)**

(i) Give **one** risk factor for Type 2 diabetes. _____ **(1)**

(g) Insulin is a hormone. Which organ system produces hormones?_____ **(1)**

Q3. The **endocrine** system is made up of glands which secrete hormones.



The Figure shows the position of endocrine glands in the human body.

(a)Which letter shows the pancreas? Circle **one**. **(1)**

A B C D

(b)Which letter shows the thyroid gland? Circle **one**. **(1)**

A B C D

(c) Which gland produces insulin? Tick (✓) **one**. **(1)**

A B C D

(d) Which gland produces hormones that stimulate the other glands to produce hormones? Tick (✓) **one**. **(1)**

A B C D

(e) Which organ system includes the glands shown above? _____ **(1)**

(f) Hormones travel from the gland where they are made to the target organ where they have an effect.

How do hormones travel from the gland to the target organ?_____ **(1)**

Q4. (a) Name **two** glands involved in human reproduction.
Do **not** refer to glands shown on the figure above in your answer.

1 _____ 2 _____ **(2)**

(b) Ovulation test kits can help women know when they are most fertile.

Ovulation test kits detect the increase in the hormone that stimulates ovulation.

Which hormone is detected by ovulation test kits? Tick (✓) **one**. (1)

- Follicle stimulating hormone (FSH) ☐
- Luteinising hormone (LH) ☐
- Oestrogen ☐
- Progesterone ☐

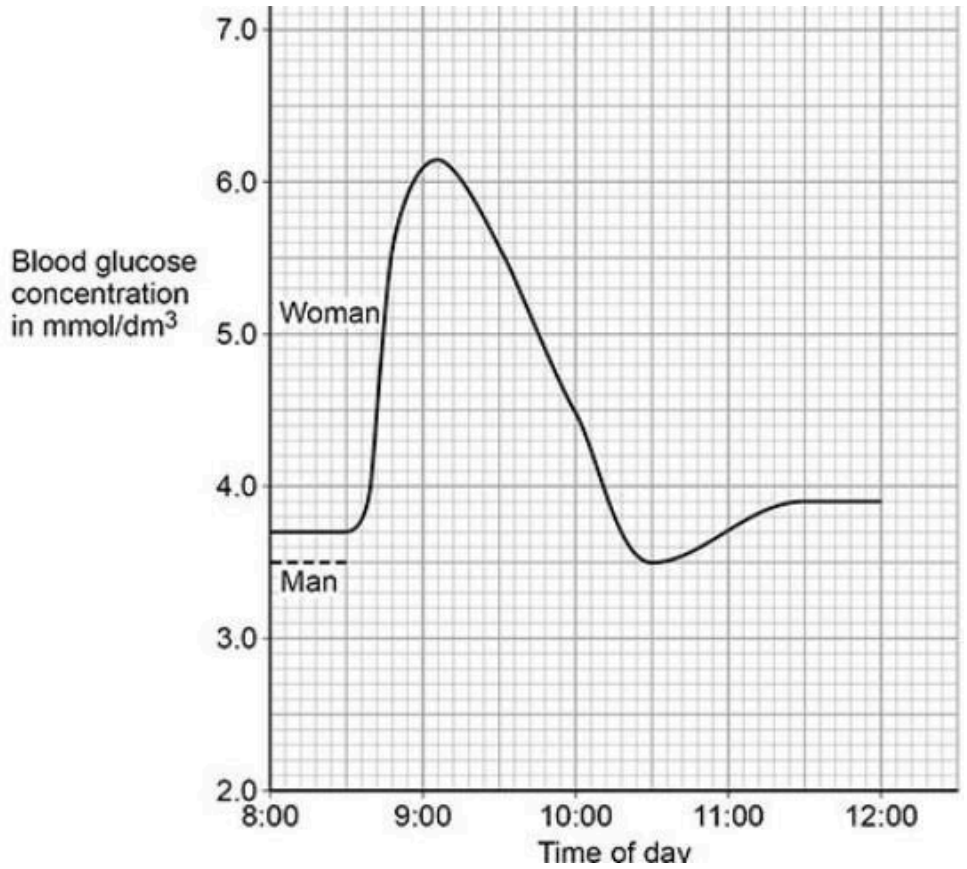
When blood glucose concentration becomes too high, hormone **X** from the pancreas causes a decrease in the glucose concentration.

(d) Name hormone **X**. _____ **(1)**

(e) Tick **two** ways that hormone **X** causes a decrease in blood glucose concentration? (2)

- Glucose is broken down. ☐
- Glucose is converted to glycogen. ☐
- Glucose is excreted by the kidneys. ☐
- Glucose moves from the blood into the cells. ☐
- Glucose moves into the small intestine. ☐

The Figure below shows the blood glucose concentration in a woman.



(f) Suggest what time of day the woman ate her breakfast of sugar-coated cereal.

Time of day = _____ **(1)**

The man in **Figure 2** has Type 2 diabetes but he has **not** been treated.

(g) The man ate:

- the same type and amount of breakfast cereal as the woman
- at the same time as the woman.

Suggest what his blood glucose concentration would be at 9:00

Blood glucose concentration = _____ mmol/dm^3 **(1)**

(h) The man:

- is an obese office worker
- does not exercise
- eats sugary snacks at his desk.

Give **two** lifestyle changes a doctor might recommend to the man to help him control his diabetes.

1 _____

2 _____ **(2)**

(i) Describe how a **low** blood glucose concentration would lead to a person feeling weak.

_____

_____

_____ **(2)**

Q5. Caffeine is a drug that affects reaction time.

Coffee is a drink that contains caffeine.

Five students **investigated** the effect of drinking coffee on their reaction time.

Each student sat in front of a computer screen showing a reaction timer.

This is the method used.

1. Press any key on the keyboard when the colour of the screen changes to green.
2. Record the reaction time shown on the computer screen.
3. Drink coffee containing caffeine.
4. Wait 15 minutes then repeat steps 1 and 2.

(a) What is the dependent variable in the investigation? Tick (✓) **one**. **(1)**

The coffee containing caffeine ☐

The number of students ☐

The reaction time ☐

(b) Give **two** control variables the students should have used.

1 _____

2 _____ **(2)**

(c) Why did the students wait 15 minutes after drinking the coffee before repeating the test?

_____ **(1)**

(d) Responding to the colour change of the screen involves a receptor in the student. Where is the receptor in the student? Tick (✓) **one**. (1)

Ear ☐ Eye ☐ Skin ☐

(e) Responding to the colour change of the screen involves an effector in the student. What is the effector in the student? Tick (✓) **one**. (1)

Brain ☐ Gland ☐ Muscle ☐ Spinal cord ☐

The table below shows the results.

Student	**Reaction time in milliseconds**	
	Before drinking coffee	**After drinking coffee**
1	385	255
2	420	291
3	285	265
4	871	259
5	463	247

(f) What is the effect of drinking coffee on reaction time? Use the table above.

_____

_____ **(1)**

(g) Which student had the smallest change in reaction time after drinking coffee? **(1)**

Student 1 ☐ Student 2 ☐ Student 3 ☐ Student 4 ☐ Student 5 ☐

(h) The students decided that one of the results was anomalous.

What should the students do with the anomalous result when calculating the mean change in reaction time?

_____

_____ **(1)**