

# GCSE Double Award Biology Higher Tier

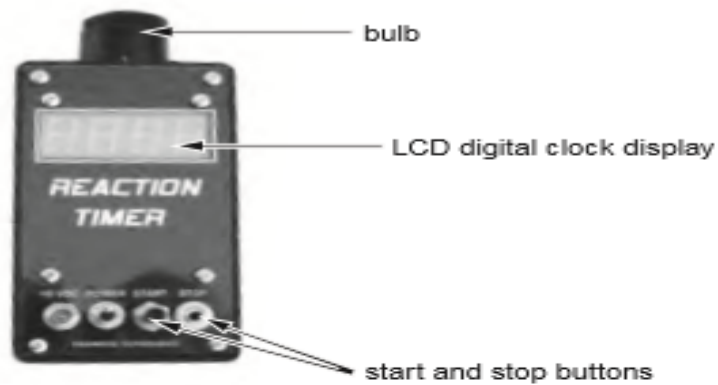
## Unit 4 / Biology 2: Topic 4.5

### Response and Regulation

1.

Megan wanted to know if playing music affected Bob's reaction time.

She used a reaction timer as shown in the photograph below.



#### Method

- The clock started timing as soon as the bulb lit up.
- When Bob saw the bulb light up, he pressed the stop button as fast as he could.
- Bob's reaction time with no music playing and then with music playing was recorded.

The results for five trials are shown below.

trial number	reaction time with no music playing (s)	reaction time with music playing (s)
1	0.20	0.53
2	0.20	0.44
3	0.20	0.40
4	0.20	0.38
5	0.20	0.25

(a) What conclusions can be made from the results of the experiment? [2]

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(b) (i) State the name of the sense organ that detects light. [1]

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(ii) Describe how information gets from sense organs to the brain. [2]

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2.

(a) Complete the sentence about the human nervous system. [2]

The central nervous system consists of the ..... and .....

(b) The diagram below shows the knee jerk response, which is a reflex action.



(i) Apart from being very fast, state **one other** feature of **all** reflex actions. [1]

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(ii) Give **one other** reflex action which occurs in the human body and state its purpose. [2]

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3.

The legal blood alcohol limit for driving in the UK is 80 mg of alcohol per 100 ml of blood. In some countries, it is illegal to drive with **any** alcohol in the blood. This is the zero limit.

(a) (i) Why is it dangerous to drive after exceeding the legal limit of blood alcohol? [1]

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(ii) Give **one** reason why some people think that there should be a **zero** limit in the UK. [1]

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(b) Alcohol is an addictive drug.  
Explain what is meant by 'an addictive drug'. [2]

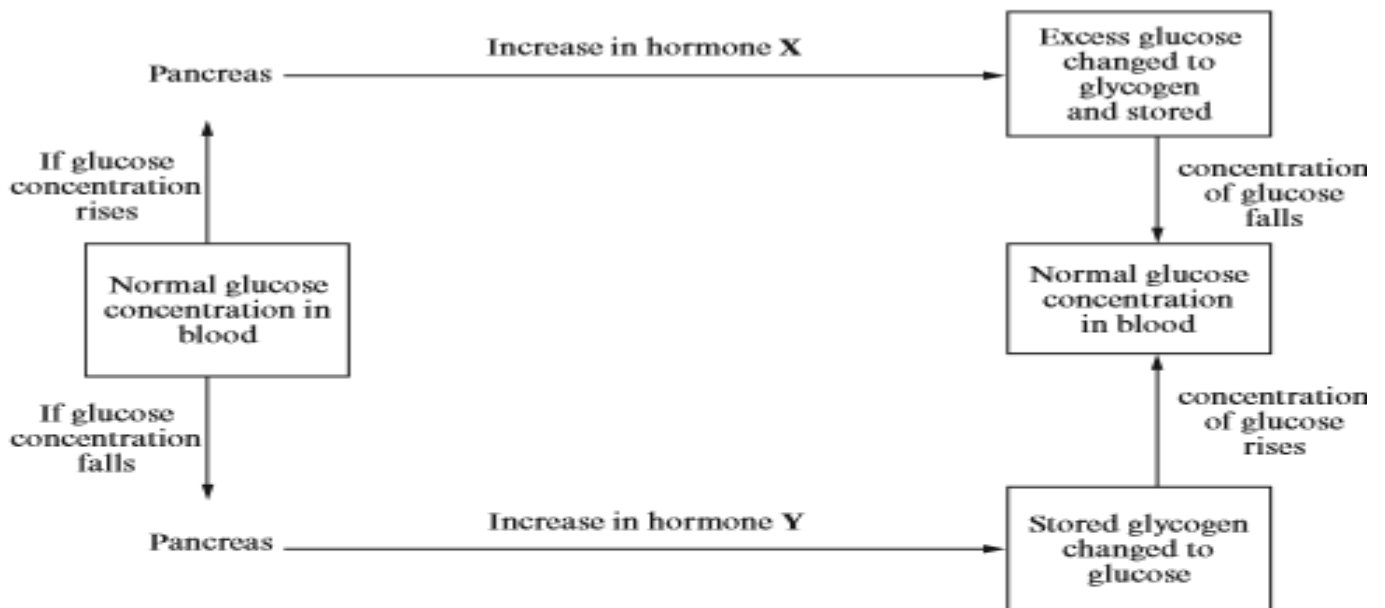
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4.

It is important to keep the concentration of glucose in the blood constant. The flow diagram shows how this happens.



(a) What term would you use to describe the control mechanism shown in the diagram? [1]

(b) Name the hormones, X and Y, shown in the diagram. [2]

(i) X .....

(ii) Y .....

(c) Name the organ of the body which stores glycogen. [1]

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(d) If the body is unable to change excess glucose into glycogen, the glucose is excreted in urine. Describe how you would test a urine sample for glucose.

(i) Procedure. [2]

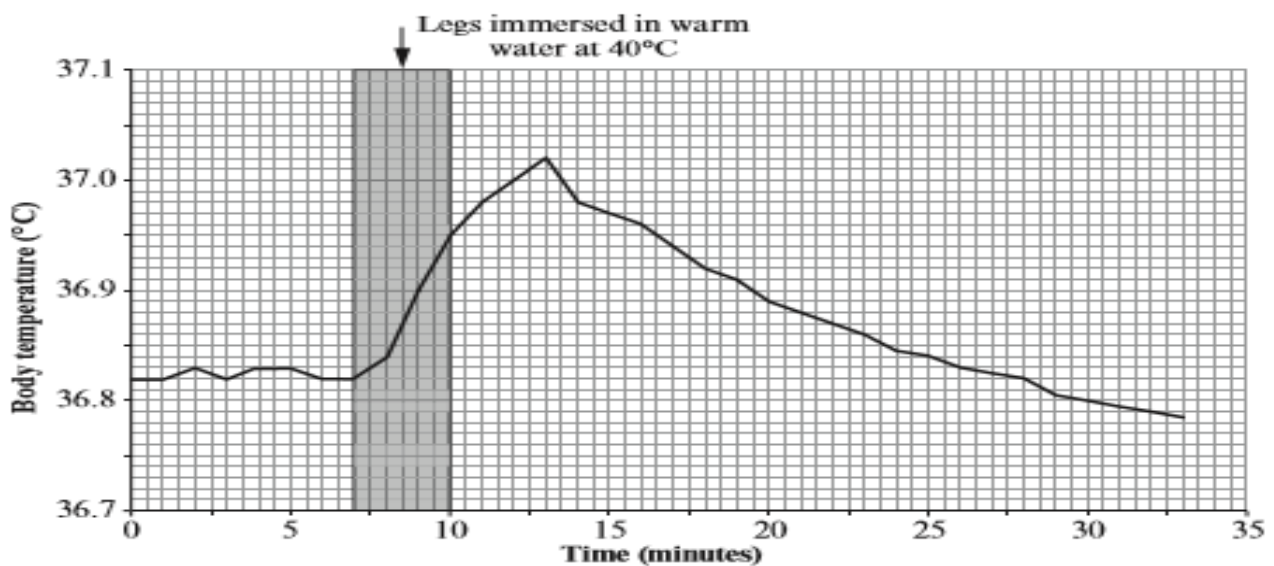
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(ii) Expected observations: [2]

If glucose is present .....

If glucose is absent .....

A scientist carried out an investigation into the body temperature of a man. The changes in the man's body temperature were measured by a clinical thermometer in his mouth. The graph below shows his body temperature over a 35 minute period. Between 7 and 10 minutes he immersed his legs, from the knees downwards, in a bath of warm water at 40°C. He then stepped out of the bath and dried his legs.

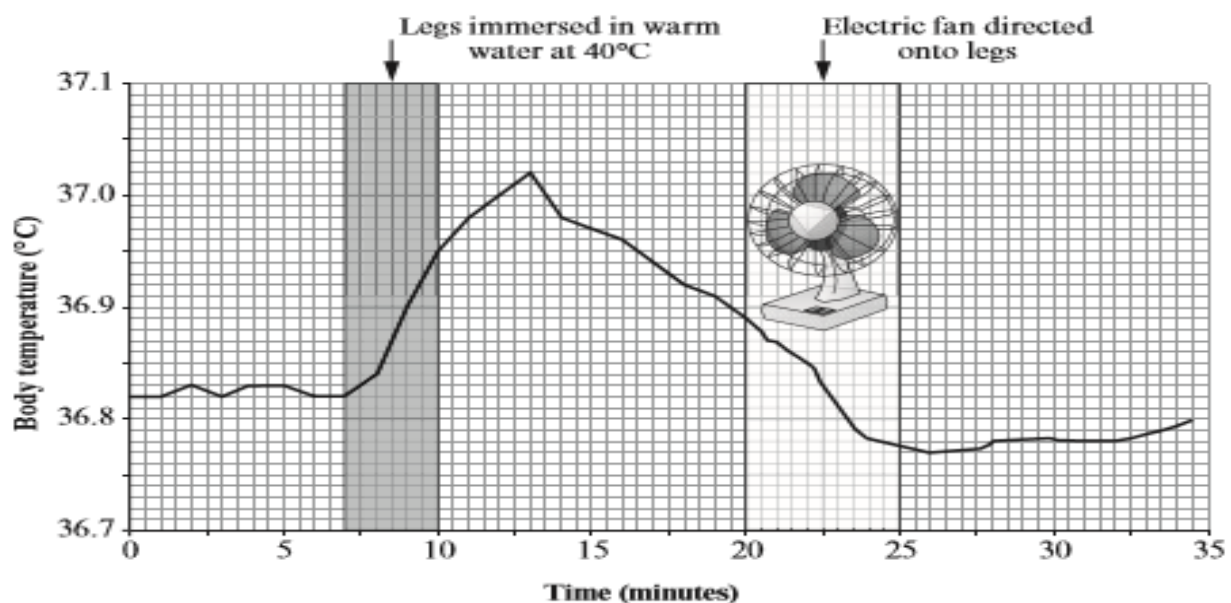


(a) Explain why the body temperature increased even though it was only the legs which were immersed in the warm water. [1]

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(b) The experiment was repeated. After 20 minutes an electric fan was directed onto the man's legs. The results are shown in the graph below.



Explain why the body temperature of the man dropped more quickly between 20 and 25 minutes when the fan was used. [2]

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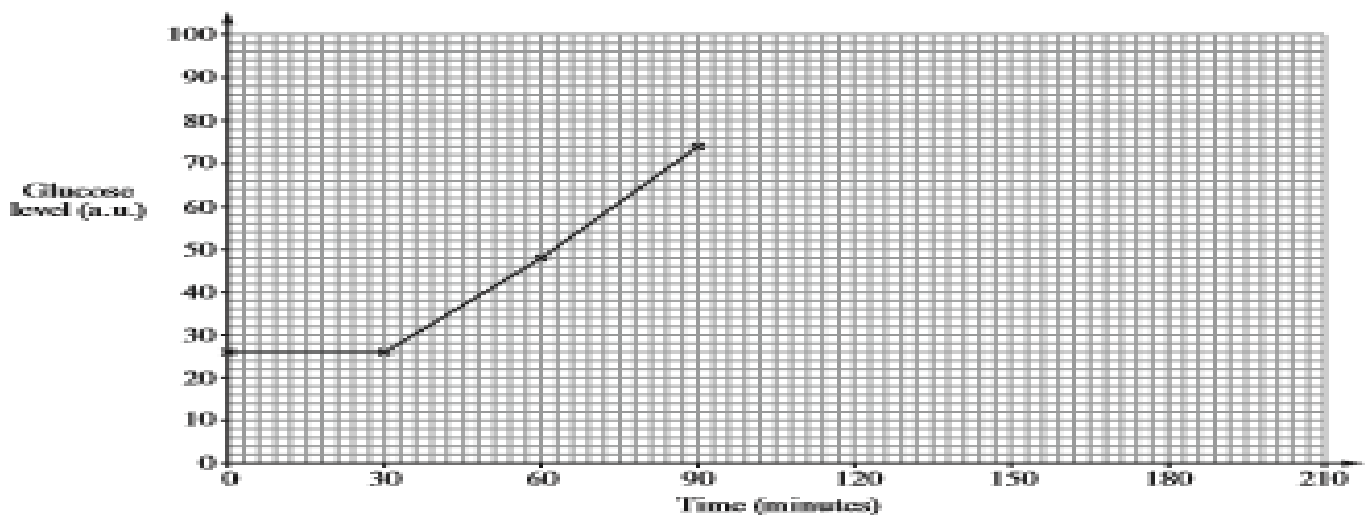
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6.

4. (a) The level of glucose in a person's blood was measured every 30 minutes for three and a half hours. During this time the person was given a drink containing glucose. The results are shown below.

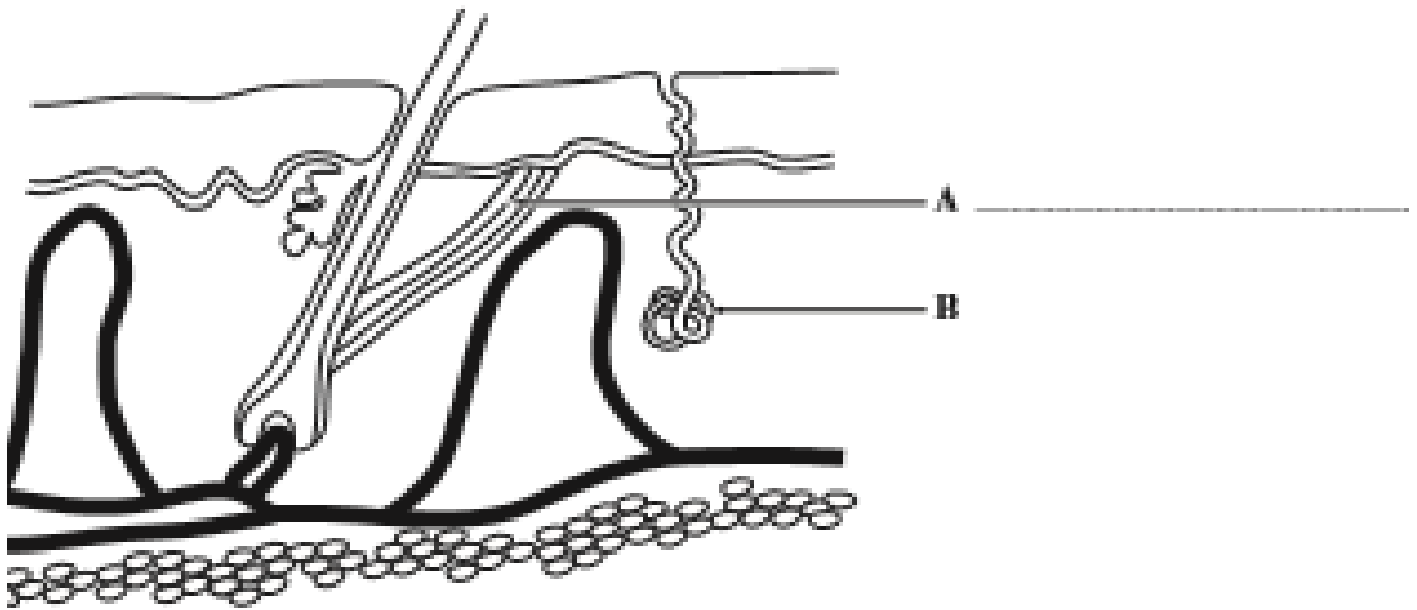
Time (minutes)	Glucose level (a.u.)
0	26
30	_____
60	_____
90	74
120	90
150	65
180	43
210	28



- (i) Use the graph opposite to complete the table of results above it. [1]
- (ii) Complete the graph by plotting the results from 90 to 210 minutes. Join the plots with a ruler. [3]
- (b) From the graph:
- (i) At what time did the person take the glucose drink? [1]
- .....
- (ii) How does the level of glucose change between 60 and 150 minutes? [1]
- .....
- (c) The level of glucose in the blood is controlled by a hormone.
- (i) Name the hormone. [1]
- .....
- (ii) Some people have a medical condition where they do not produce enough of this hormone. Name the condition. [1]
- .....

7.

The diagram shows a section through the skin.



(a) Label part A on the diagram.

[1]

(b) Explain, in detail, the role part B plays in lowering the body temperature in warm conditions.

[6 QWC]

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