

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GCSE**

**A162/01**

**TWENTY FIRST CENTURY SCIENCE  
BIOLOGY A/ADDITIONAL SCIENCE A  
Modules B4 B5 B6 (Foundation Tier)**

**FRIDAY 6 JUNE 2014: Afternoon**

**DURATION: 1 hour  
plus your additional time allowance  
MODIFIED ENLARGED 24pt**

<b>Candidate forename</b>		<b>Candidate surname</b>	
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<b>Centre number</b>						<b>Candidate number</b>				
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**Candidates answer on the Question Paper.  
A calculator may be used for this paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Pencil**

**Ruler (cm/mm)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

**Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**

**Use black ink. HB pencil may be used for graphs and diagrams only.**

**Answer ALL the questions.**

**Read each question carefully. Make sure you know what you have to do before starting your answer.**

**Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

## **INFORMATION FOR CANDIDATES**

**The quality of written communication is assessed in questions marked with a pencil ().**

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

**The total number of marks for this paper is 60.**

**Any blank pages are indicated.**

**Answer ALL the questions.**

**1 Enzymes are found in the human body.**

**(a) Write down the effect enzymes have on chemical reactions.**

\_\_\_\_\_ **[1]**

**(b) Put ticks (✓) in the boxes next to the THREE statements that describe enzymes.**

**Enzymes are made from starch.** ☐

**Enzymes are sections of DNA.** ☐

**Enzymes have an active site.** ☐

**Enzymes are made from instructions in genes.** ☐

**The four types of enzymes are A, T, C and G.** ☐

**Enzymes are proteins.** ☐

**Enzymes are waste products.** ☐

**[3]**

**(c) Washing powders are used to remove food stains from clothes.**

**Some washing powders contain enzymes.**

**(i) Suggest what enzymes do to the food stains.**

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**[1]**

**(ii) Manufacturers recommend a wash temperature of 30°C rather than 90°C for washing powders containing enzymes.**

**Suggest why.**

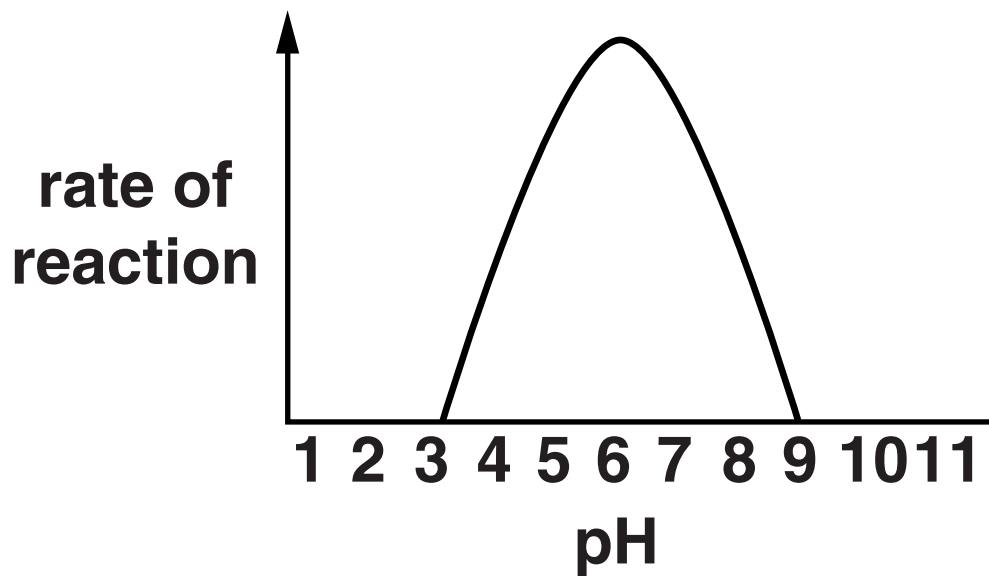
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**[2]**

**(d) The graph shows how pH affects the rate of reaction of an enzyme.**



**A student concludes that the enzyme only works at pH 6.**

**Is the student correct?**

**Explain your answer.**

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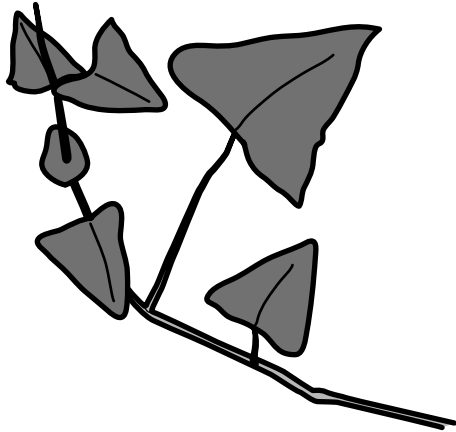
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**[3]**

**[TOTAL: 10]**



**2 The mile-a-minute vine is a plant. It grows very quickly.**



**The vine makes its food using a process called photosynthesis.**

**Describe the process of photosynthesis.**

**Suggest why the rate of photosynthesis in this plant is very fast.**



**The quality of written communication will be assessed in your answer.**

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[6]

**[TOTAL: 6]**

### **3 Living organisms obtain energy using respiration.**

**Look at the equations below for the two different types of respiration.**

**They show the energy released from the same amount of glucose.**

**Type A**

**glucose + oxygen  $\longrightarrow$  carbon dioxide + water + 2880 kJ**

**Type B**

**glucose  $\longrightarrow$  lactic acid + 150 kJ**

**(a) Write down the names of Type A and Type B respiration.**

**Type A \_\_\_\_\_**

**Type B \_\_\_\_\_**

**[1]**

**(b) Calculate the ratio:**

$$\frac{\text{energy released in Type A}}{\text{energy released in Type B}}$$

**Show your working.**

**ratio = \_\_\_\_\_**

**[2]**

**BLANK PAGE**

- (c) Jenny is running in a 26 mile marathon race.**

**For MOST of the race Jenny  
respires using Type A respiration.**

**Suggest reasons why this is important.**

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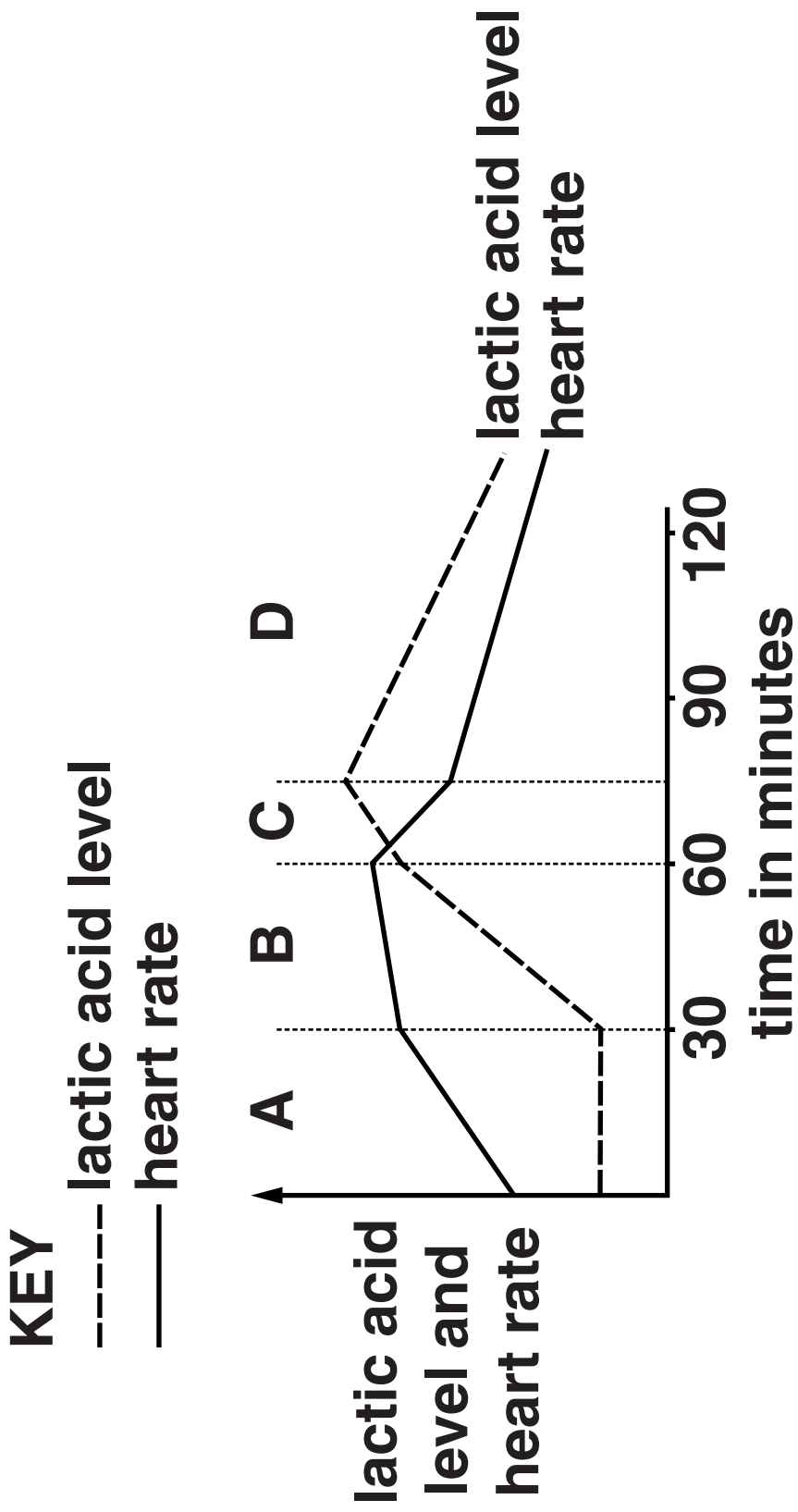
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[2]

- (d) The graph opposite shows Jenny's heart rate and the lactic acid level in her blood during a training session.**



**(i) Jenny makes this conclusion.  
She says:**

**“There is always the same  
correlation between my heart  
rate and my lactic acid level,  
however long or fast I run.”**



**Discuss how well her conclusion fits the data in the graph.**

**Use information from sections A, B, C and D in your answer.**

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**[4]**

**(ii) Jenny thinks that some of her data is incorrect.**

**What should she do to become more confident in her conclusion?**

**Put a tick (✓) in the box next to the correct answer.**

**Repeat the same training a number of times.**

☐

**Repeat her training but only run for 60 minutes.**

☐

**Run more slowly so that her heart rate does not rise too much.**

☐

**Repeat the same experiment on other runners.**

☐

**[1]**

**[TOTAL: 10]**

**4 During sexual reproduction a sperm cell fertilises an egg cell.**

**(a) What is this fertilised egg cell called?**

**Put a tick (✓) in the box next to the correct answer.**

**embryo** ☐

**zygote** ☐

**fetus** ☐

**gamete** ☐

**[1]**

**(b) The fertilised egg divides to form 2 cells.**

**These 2 cells divide to form 4 cells.**

**These 4 cells divide to form 8 cells.**

**How many divisions are needed to form a group of 128 cells from one fertilised egg?**

**Show your working.**

**answer = \_\_\_\_\_ divisions. [2]**

**(c) After how many divisions will the cells start to become specialised?**

**answer = \_\_\_\_\_ [1]**

**(d) Some cells remain unspecialised.**

**Write down the name of these cells and what may happen to them at a later time.**

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**[2]**

**[TOTAL: 6]**

**5 Frogs grow by producing new body cells.**

**Adult frogs reproduce sexually by making sex cells (gametes).**

**Describe how body cells and sex cells are made.**



**The quality of written communication will be assessed in your answer.**

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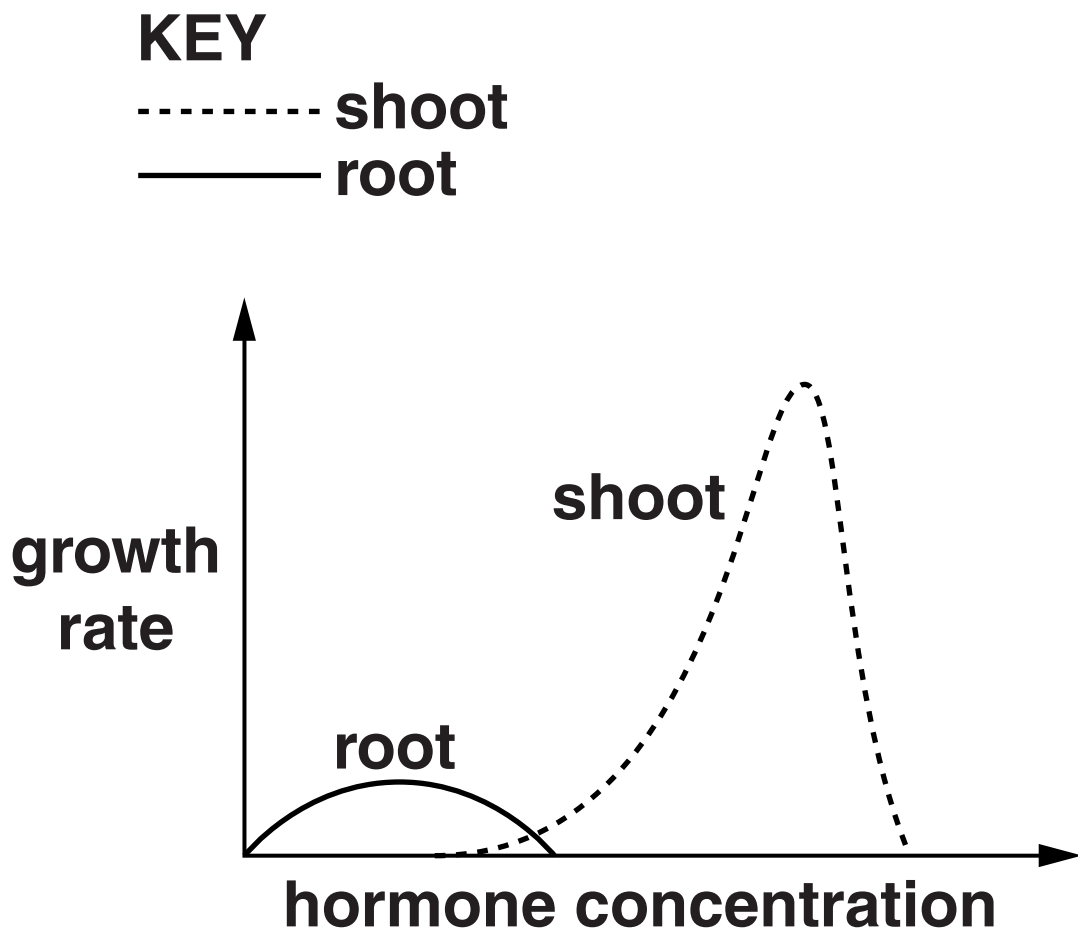
**[6]**

**[TOTAL: 6]**

**6 A plant hormone affects the growth of shoots and roots.**

**Look at the graph.**

**It shows the effect of different concentrations of this hormone on shoot growth and root growth.**





**(a) Two of these are correct conclusions from the data.**

**Put ticks (✓) in the boxes next to the TWO correct conclusions.**

**Root growth requires lower concentration of hormone than shoot growth.**

☐

**Increasing the hormone concentration has no effect on shoot growth.**

☐

**Roots and shoots both grow at very high hormone concentrations.**

☐

**All hormone concentrations increase the growth rate of shoots.**

☐

**The hormone causes a greater rate of shoot growth than root growth.**

☐

**[2]**

**(b) Shoot growth is also affected by light.**

**Write down the name of a shoot's growth response to light.**

\_\_\_\_\_ **[1]**

**(c) This growth response increases the plant's chance of survival.**

**Explain why.**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ **[2]**

**[TOTAL: 5]**

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**7 Scientists studied four different areas of the brain, A, B, C and D.**

**They discovered this information.**

**A When A was stimulated the patient saw flashing lights.**

**B Area B responded when perfume was sprayed in the room.**

**C Area C responded when the patient listened to music.**

**D When D was stimulated the patient's finger bent.**

**(a) Use this information to draw four straight lines linking each AREA OF THE BRAIN on the left to its FUNCTION on the right.**

**AREA OF BRAIN**

**A**

**B**

**C**

**D**

**FUNCTION**

**smell**

**movement**

**sight**

**hearing**

**[3]**

**(b) Which part of the brain, A, B, C or D, is involved with motor responses?**

**Explain your answer.**

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**[2]**

**(c) Scientists discover a lot about the brain by studying patients with brain damage.**

**(i) Two of these statements are ETHICAL issues involved in this kind of scientific research.**

**Put ticks (✓) in the boxes next to the TWO correct answers.**

**The patient's brain contains millions of neurons.**

☐

**The patient's CNS consists of both motor and sensory neurons.**

☐

**Some brain damaged patients are paralysed.**

☐

**The patient may not benefit from the research.**

☐

**The patient needs to give informed permission for the research.**

☐

**[2]**

- (ii) Scientists sometimes ask patients to take part in low risk studies.**

**Two of these statements describe why patients may be willing to take part in low risk studies.**

**Put ticks (✓) in the boxes next to the TWO best statements.**

**People are more willing to accept risk when it is something that they choose to do.**

☐

**A correlation is a link between a factor and an outcome.**

☐

**Scientists do not believe claims that cannot be repeated by any other scientists.**

☐



**People are happy to take risks if this leads to the best outcome for most people.**

☐

**Certain actions are wrong whatever the consequences.**

☐

**[2]**

**(d) Synapses are small gaps between the ends of neurons.**

**Chemicals allow impulses to cross the gap.**

**Some poisons stop these chemicals from working.**

**What effect would these poisons have on your fingers?**

**Put ticks (✓) in the boxes next to the TWO best answers.**

**Your fingers would be painful.**

☐

**Your fingers would feel numb.**

☐

**There would be no effect on your fingers.**

☐

**The muscles in your fingers would contract.**

☐

**Your fingers would not move.**

☐

**Your fingers would turn white.**

☐

**[2]**

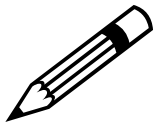
**[TOTAL: 11]**

**8 Animals respond to changes in their environment.**

**A predator appears and causes a rapid response in a squirrel.**

**Suggest what this response might be.**

**Describe the processes that occur in the squirrel to cause this rapid response.**



**The quality of written communication will be assessed in your answer.**

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[6]

[TOTAL: 6]

**END OF QUESTION PAPER**

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