

Centre Number						Candidate Number					
Surname						Other Names					
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Candidate Signature						Date					

For Examiner's Use Total EMPA mark	
Examiner's Initials	
Section	Mark
Task 1	
Task 2	
Section A	
Section B	
TOTAL EMPA MARK	



General Certificate of Education
Advanced Subsidiary Examination
June 2012

Biology

BIO3X

Unit 3X AS Externally Marked Practical Assignment Written Test

For submission by 15 May 2012

For this paper you must have: <ul style="list-style-type: none"> the Task Sheet 2, your results and your graph a ruler with millimetre measurements a calculator. 	Time allowed <ul style="list-style-type: none"> 1 hour 15 minutes
Instructions: <ul style="list-style-type: none"> Use black ink or black ball-point pen. Fill in the boxes at the top of this page. Answer all questions. You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages. Do all rough work in this book. Cross through any work you do not want to be marked. 	Information <ul style="list-style-type: none"> The marks for questions are shown in brackets. The maximum mark for this paper is 30. You will be marked on your ability to: <ul style="list-style-type: none"> use good English organise information clearly use scientific terminology accurately.

Details of additional assistance (if any). Did the candidate receive any help or information in the production of this work? If you answer yes give the details below or on a separate page.

Yes No

Teacher Declaration:

I confirm that the candidate has met the requirements of the practical skills verification (PSV) in accordance with the instructions and criteria in section 3.8 of the specification.

Practical Skills Verification	Yes <input type="checkbox"/>
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Signature of teacher Date

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Section A

These questions are about your investigation into the effect of exercise on pulse rate.
Use your copy of Task Sheet 2, your results and your graph to answer them.

Answer **all** questions in the spaces provided.

7 Give **two** things you did to standardise the way in which you exercised that would have allowed you or another person to repeat the investigation in exactly the same way.

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2

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(2 marks)

8 At rest, you measured your pulse every minute. After exercise, you measured your pulse every 30 seconds (step 4). Explain the advantage of measuring your pulse every 30 seconds.

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(1 mark)

9 You were told to draw a graph (Question 6). You may have decided to join your points with straight lines or to draw a curve of best fit.
When should you join the points with straight lines?

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(1 mark)

10 A student wanted to analyse the results from the whole class.
She decided to calculate the percentage increase in pulse rate with exercise for each student. Do you think this was a good idea? Explain your answer.

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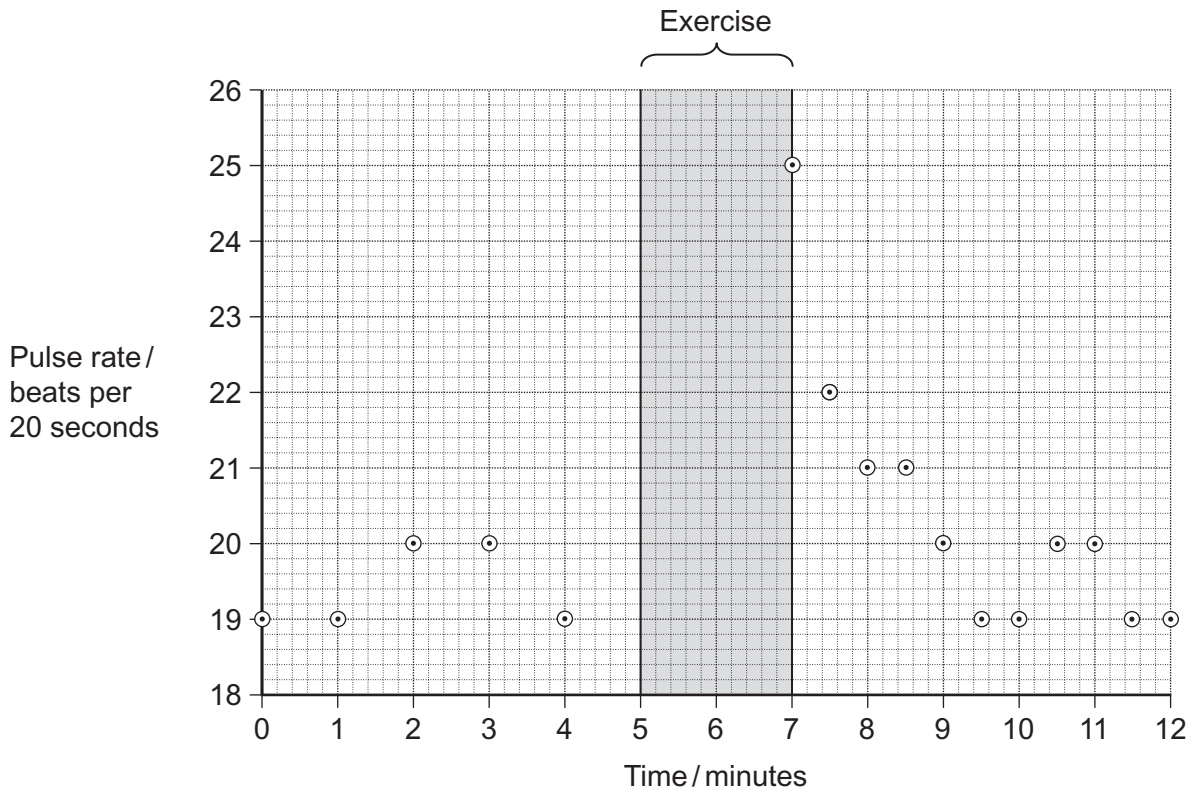
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(2 marks)

The graph shows the results collected by another student.



11 Use the graph to calculate the student's **resting** pulse rate in beats per minute. Show your working.

Answer beats per minute
(2 marks)

12 The pulse rate changed between the start and finish of exercise. Explain the advantage of this change in pulse rate to the muscles involved in the exercise.

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(2 marks)

Resource Sheet

Resource A

An electrocardiogram is made by attaching recording electrodes to a person's chest. It shows the electrical changes that take place in a person's heart each time it beats. A sports physiologist produced electrocardiograms for a fit adult male.

Chart X shows an electrocardiogram from this man after 10 minutes of complete rest. A cardiac cycle consists of the filling time and the contraction time. The filling time and the contraction time for one cardiac cycle are shown on this chart.

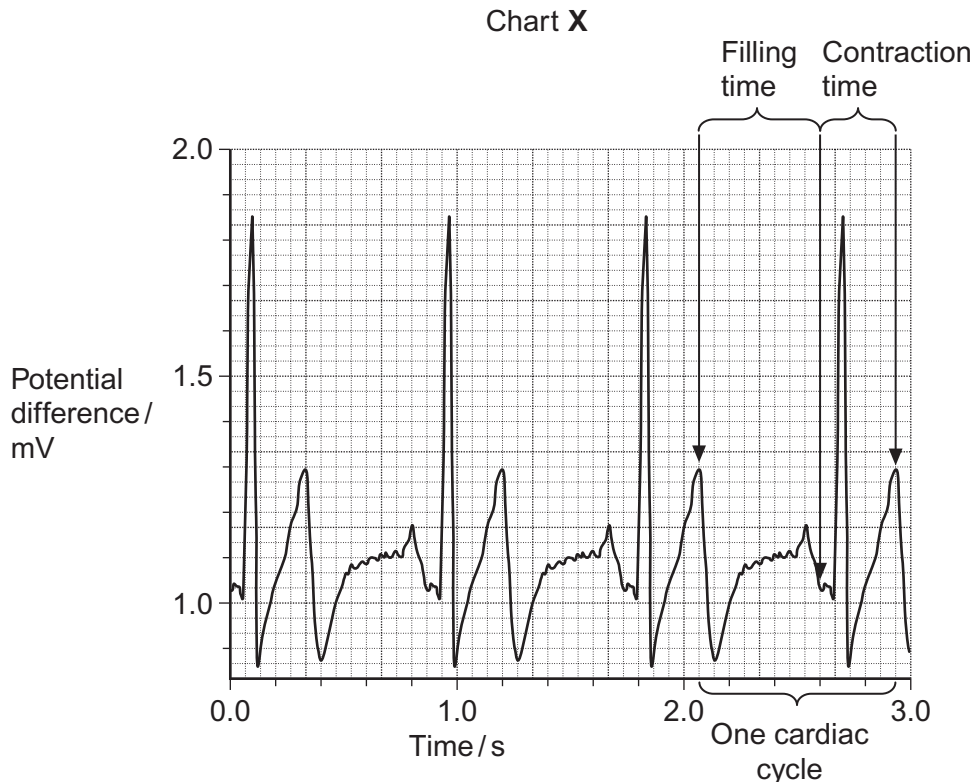
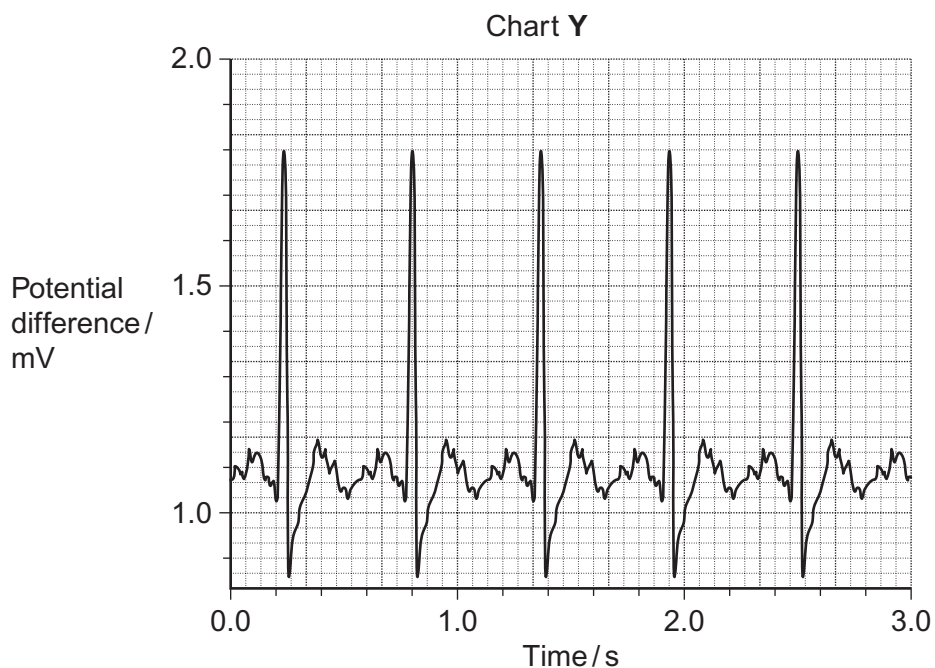


Chart Y shows an electrocardiogram from the same man immediately after a period of exercise.



Resource B

Doctors investigated the relationship between resting heart rate and the probability of dying from coronary heart disease.

- They carried out a trial on a total of 24 913 patients. These patients had just been diagnosed with coronary heart disease.
- They adjusted their data to take into account other risk factors. These factors included age, sex and blood pressure.

Their adjusted results are shown in the table.

Time after first being diagnosed with coronary heart disease /years	Percentage of patients still surviving with initial resting heart rate of	
	< 62 beats per minute	> 83 beats per minute
0	100	100
5	92	90
10	83	77
15	71	62
18	62	51

Resource C

Ivabradine is a drug that slows heart rate. It is taken as a pill. Doctors investigated its value in reducing the resting heart rate of patients with coronary heart disease.

- They described their investigation as a large-scale, controlled trial. It was also carried out on people living in different areas.
- The results of the trial showed that ivabradine slowed heart rate.
- Angina is a pain in the chest. It results when insufficient oxygen is brought to the heart muscle during exercise. The doctors found that ivabradine reduced angina.

Turn over ►

Section B

Use the information in the **Resource Sheet** and your own knowledge to answer the questions.

Answer **all** questions in the spaces provided.

Use **Resource A** to answer **Questions 13 to 16**.

13 Give **one** way in which an electrocardiogram could have produced more reliable results than counting the pulse.

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(1 mark)

14 (a) Chart **X** shows that the man's resting heart rate was 69.2 beats per minute. What was his pulse rate? Explain your answer.

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(2 marks)

14 (b) Use chart **Y** to calculate the man's heart rate after the period of exercise. Show your working.

Answer beats per minute
(2 marks)

15 Use charts **X** and **Y** to describe how exercise affected filling time.

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(2 marks)

16 The physiologist used electrocardiograms to investigate the effect of increasing heart rate on filling time.
Describe how she could have modified the method of exercising you used to produce a range of increases in heart rate.

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(2 marks)

Turn over for the next question

Turn over ►

Use **Resource B** to answer **Question 17**.

17 The doctors who investigated the link between resting heart rate and the probability of dying from coronary heart disease concluded that a high resting heart rate was a strong predictor of likely death from coronary heart disease.
Evaluate this conclusion.

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(3 marks)

(Extra space)

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Use **Resource C** to answer **Questions 18 to 20**.

18 The results of the ivabradine trial were reliable.

18 (a) Explain the importance of the ivabradine investigation being a large-scale trial.

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(1 mark)

18 (b) Explain the importance of the ivabradine investigation being carried out on people living in different areas.

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(1 mark)

19 The ivabradine investigation was a controlled trial. Suggest how the control group would have been treated.

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(2 marks)

Turn over for the next question

Turn over ►

20 Ivabradine slows heart rate.

20 (a) Use information from **Resource A** to explain why ivabradine increases the volume of blood entering the heart during a cardiac cycle.

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(1 mark)

20 (b) Ivabradine reduces angina. Suggest how an increase in the volume of blood entering the heart reduces angina.

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(3 marks)

(Extra space)

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20

END OF QUESTIONS

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ANSWER IN THE SPACES PROVIDED**

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