

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A**

Life Care

HIGHER TIER

WEDNESDAY 13 JUNE 2007

H A324/02

Morning

Time: 45 minutes

Candidates answer on the question paper.
Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)



* G O E / T 3 2 9 0 1 *

Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The marks allocated and the spaces provided for your answers are a good indication of the length of answers required.

FOR EXAMINER'S USE		
Qu.	Max	Mark
1	8	
2	8	
3	9	
4	11	
TOTAL	36	

This document consists of **10** printed pages and **2** blank pages.

Answer **all** the questions.

1 Jaimie is training to run in the Olympics.
His coach checks his fitness regularly and changes his training programme when necessary.

(a) State and explain **two** reasons why the coach might need to unexpectedly change Jaimie's training programme.

reason

explanation

.....

.....

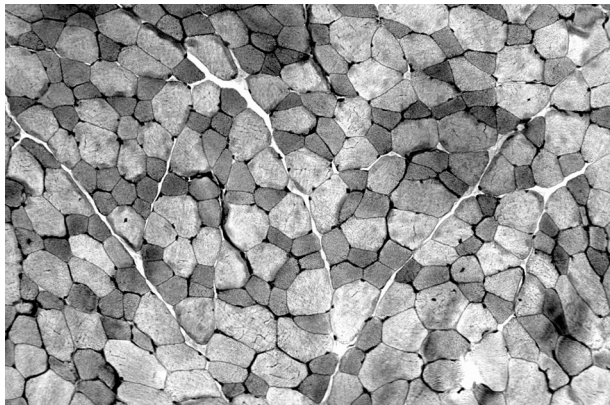
reason

explanation

.....

.....[4]

(b) The coach wants Jaimie to have a test on a muscle in his leg.
Leg muscles contain two types of fibres.



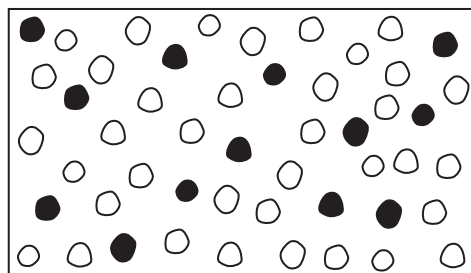
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Slow-twitch fibres are good for long distance running.
Fast-twitch fibres are good for sprinting.
The diagram below shows the results of Jaimie's test.
There are 37 fast-twitch muscle fibres in the diagram.

Key

○ fast-twitch

● slow-twitch



- (i) Calculate the percentage of slow-twitch fibres in the **diagram**.
Use the equation below.

$$\% \text{ of slow-twitch fibres} = \frac{\text{number of slow-twitch fibres}}{\text{total number of muscle fibres}} \times 100$$

% of slow-twitch fibres =[2]

- (ii) Calculate the percentage of fast-twitch fibres.

% of fast-twitch fibres =[1]

- (iii) The table below shows the ideal percentage of slow-twitch and fast-twitch muscle fibres for some running events.

event	slow-twitch fibres (%)	fast-twitch fibres (%)
100m sprint	23	77
1500m run	50	50
10 000m run	65	35
marathon	80	20

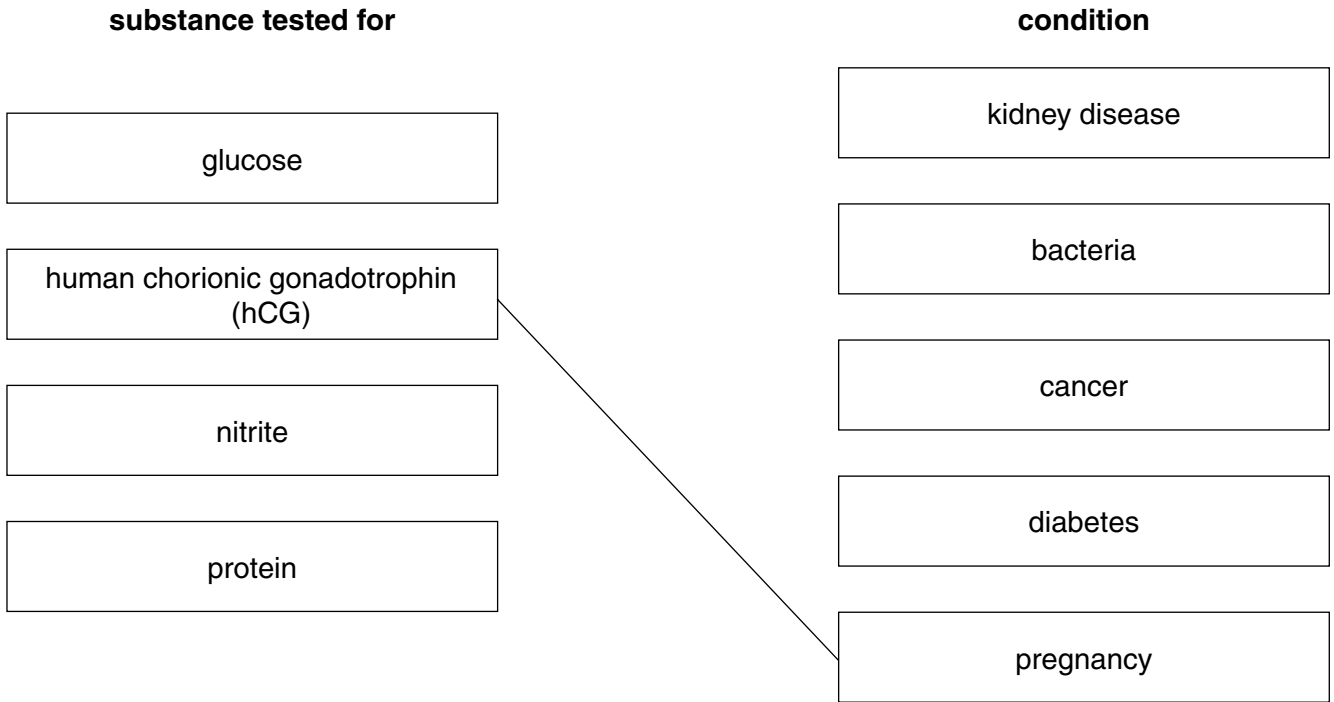
Use the table to suggest which event Jaimie is best suited to.

.....[1]

[Total: 8]

2 Shivani wants to become a pilot.
She has a medical before she starts training.
At the medical a nurse collects urine and blood samples.

(a) (i) The urine sample is tested for various conditions.
Draw a straight line from each **substance tested for** to its correct **condition**.
One has been done for you.



[3]

(ii) Describe how the nurse takes a blood sample.

.....

.....

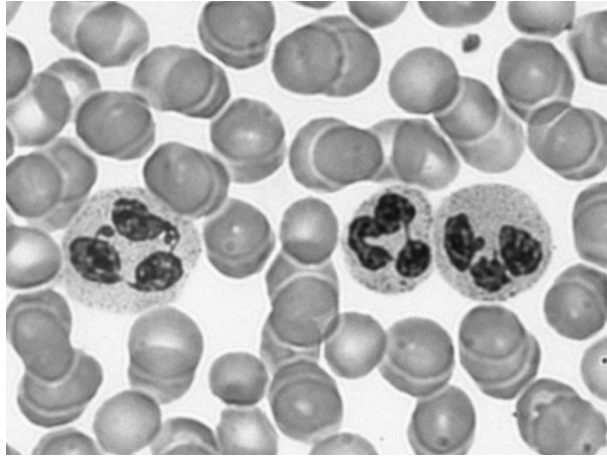
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.....

.....[3]

(iii) The picture below shows Shivani's blood under the microscope.

Label **one** red blood cell and **one** white blood cell.



© Dr. Gopal Murti / Science Photo Library

[1]

(b) Shivani's blood sample contains some chemicals which suggest that her heart is not working properly.
Name **one** technique which could be used to observe and monitor how Shivani's heart is working.

.....
.....[1]

[Total: 8]

3 A community Health Centre needs a new nurse.
Kim is writing an advertisement for the new nurse.
He can think of a number of personal qualities a nurse should have.

(a) (i) Explain **why** a nurse needs to be an effective communicator.

.....
.....
.....[2]

(ii) Suggest two other **different** qualities the nurse should have.

1

2[2]

(b) The new nurse will work with the rest of the healthcare team to help people maintain their health and fitness.

(i) Give the title and role of **two other** health practitioners likely to be a part of the healthcare team.

1 title

role

.....

2 title

role

.....[2]

(ii) Describe and explain **one** example to show the importance of education and public information about health.

.....
.....
.....
.....
.....[3]

[Total: 9]

4 Jasmine is 41 years old and pregnant.
She is given an ultrasound scan to examine her baby.

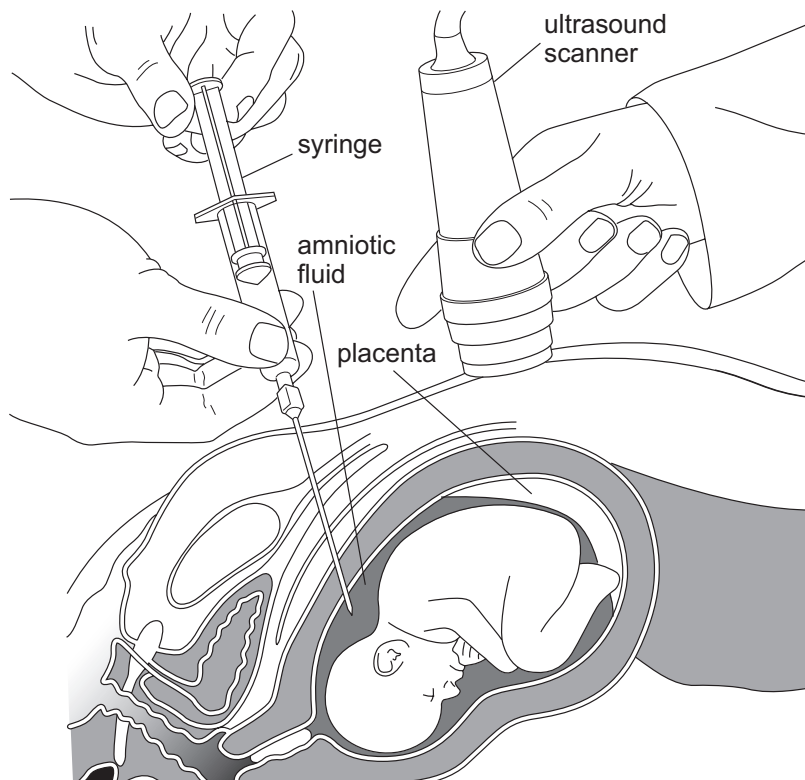
(a) (i) Give **one** reason why Jasmine has the scan.

.....
.....
.....[1]

(ii) Explain why Jasmine can have an ultrasound scan but is **not** likely to be offered an X-ray.

.....
.....
.....[2]

(b) She is offered a test to screen for Down's Syndrome.
The diagram shows how the test is carried out.
Amniotic fluid contains cells from the baby. These are examined for signs of Down's Syndrome.



(i) Suggest why the ultrasound scanner is used to help with this test.

.....
.....
.....[1]

- (ii) Explain why the risk to Jasmine must be assessed before this diagnostic test can be carried out.

.....

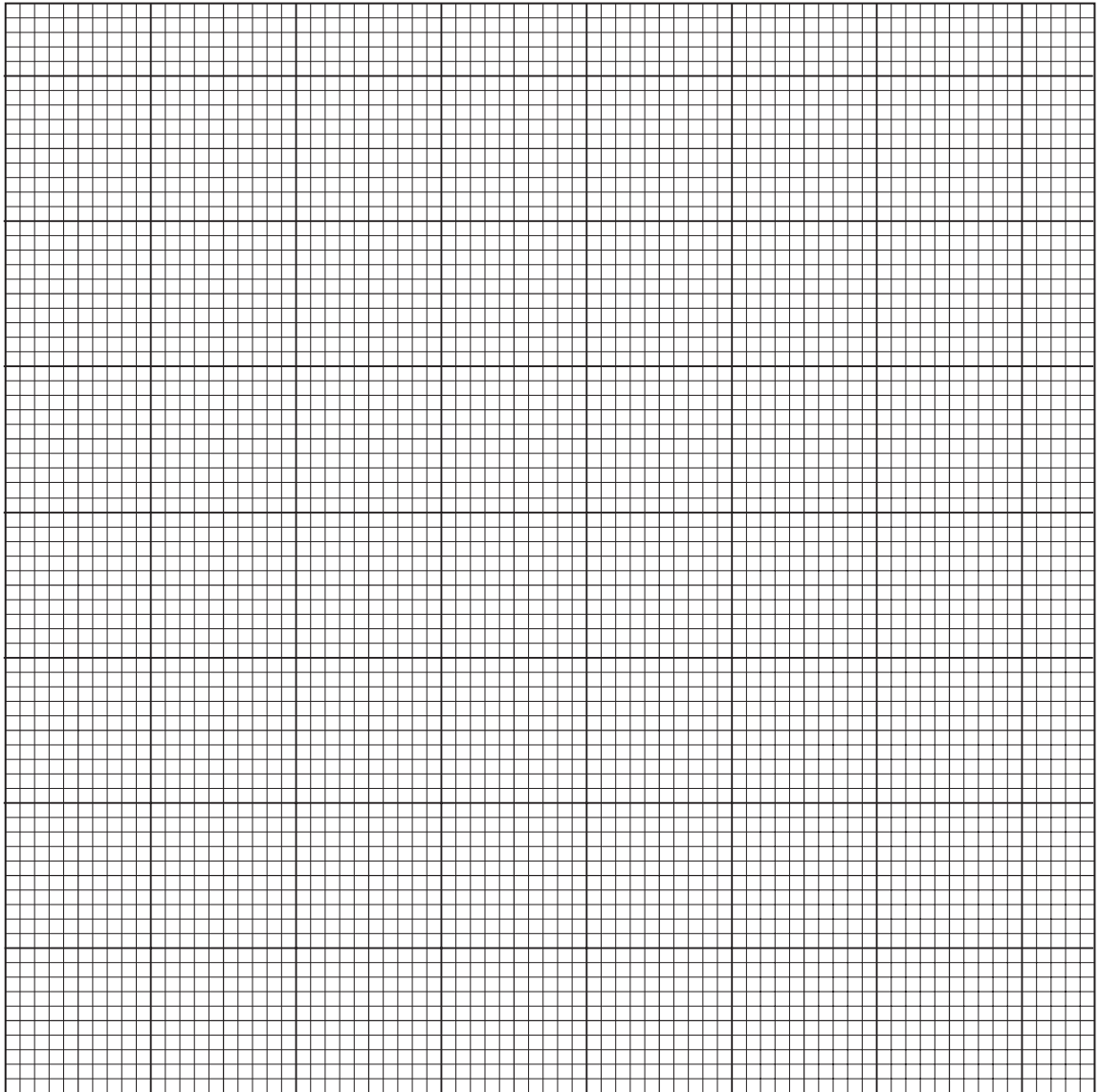
.....

.....[2]

- (c) The table shows the number of babies with Down's Syndrome born to mothers of different ages.

age of mother in years	number of Down's Syndrome cases per 10 000 live births
15	4
20	6
25	8
30	10
35	30
40	80
45	140

- (i) Plot the information on the grid below. Finish the graph by drawing the best line through the points. [3]



- (ii) Jasmine has two teenage children. She was not offered a test for Down's Syndrome before they were born. Use the information above to suggest why.

.....

.....

.....

.....

.....

..... [2]

[Total: 11]

END OF QUESTION PAPER

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