

Candidate Name	Centre Number	Candidate Number
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GCSE

682/02

ADDITIONAL APPLIED SCIENCE

Unit 2: Science at Work in Applied

Contexts

HIGHER TIER

P.M. WEDNESDAY, 21 May 2008

45 minutes



For Examiner's use only	
Section A	
Section B	
Total	

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

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

You are reminded of the necessity for good English and orderly presentation in your answers.

You are reminded to show all your working. Credit is given for correct working even when the final answer given is incorrect.

SECTION A (24 marks)*Answer all the questions in the spaces provided.*

1. The following food label comes from a box of cereal.

Nutritional information	
protein	10 g
carbohydrate	64 g
fat	2 g
fibre	16 g
salt	2 g
Values per 100 g	

- (a) Complete the table below to show the mass of each nutrient in 25 g.

[2]

Nutritional information	
protein	2.5 g
carbohydrate
fat	0.5 g
fibre
salt	0.5 g
Values per 25 g	

- (b) The cereal can be served with different types of milk. The table below shows some nutritional information about these types of milk.

type of milk	protein (g)	carbohydrates (g)	fat (g)
skimmed	4.4	6.2	0.3
semi-skimmed	4.4	6.2	2.2
whole	4.4	6.2	5.2
Values per 125 ml			

A bowl contains 25 g of cereal and 125 ml of milk.

- (i) What is the total fat content of this serving if **whole milk** is used? [1]

Total fat content = g

- (ii) Give **one** reason why an overweight person should use skimmed milk in their cereal. [1]

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- (c) (i) The label on the milk says that it should be kept in the refrigerator. **Explain** why. [2]

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- (ii) The label also gives a 'use by' date. **Explain** why the milk should not be drunk after this date. [2]

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2. Scientists think that type 2 diabetes is related to obesity.

(a) Name **two** other health problems that can be caused by obesity. [2]

1. 2.

(b) Obesity can be measured by the Body Mass Index (BMI).
BMI is found using the equation:

$$\text{BMI} = \frac{\text{mass (kg)}}{\text{height}^2 \text{ (m}^2\text{)}}$$

(i) Find the BMI for Tom who has a mass of 90 kg and a height of 1.5 m. [2]

BMI = kg/m²

(ii) Use the information below to identify the body type for Tom. [1]

- A BMI less than 18.5 is *underweight* body type
- A BMI of 18.5-24.9 is *normal weight* body type
- A BMI of 25.0-29.9 is *overweight* body type
- A BMI of 30.0-39.9 is *obese* body type
- A BMI of 40.0 or higher is *severely (or morbidly) obese* body type

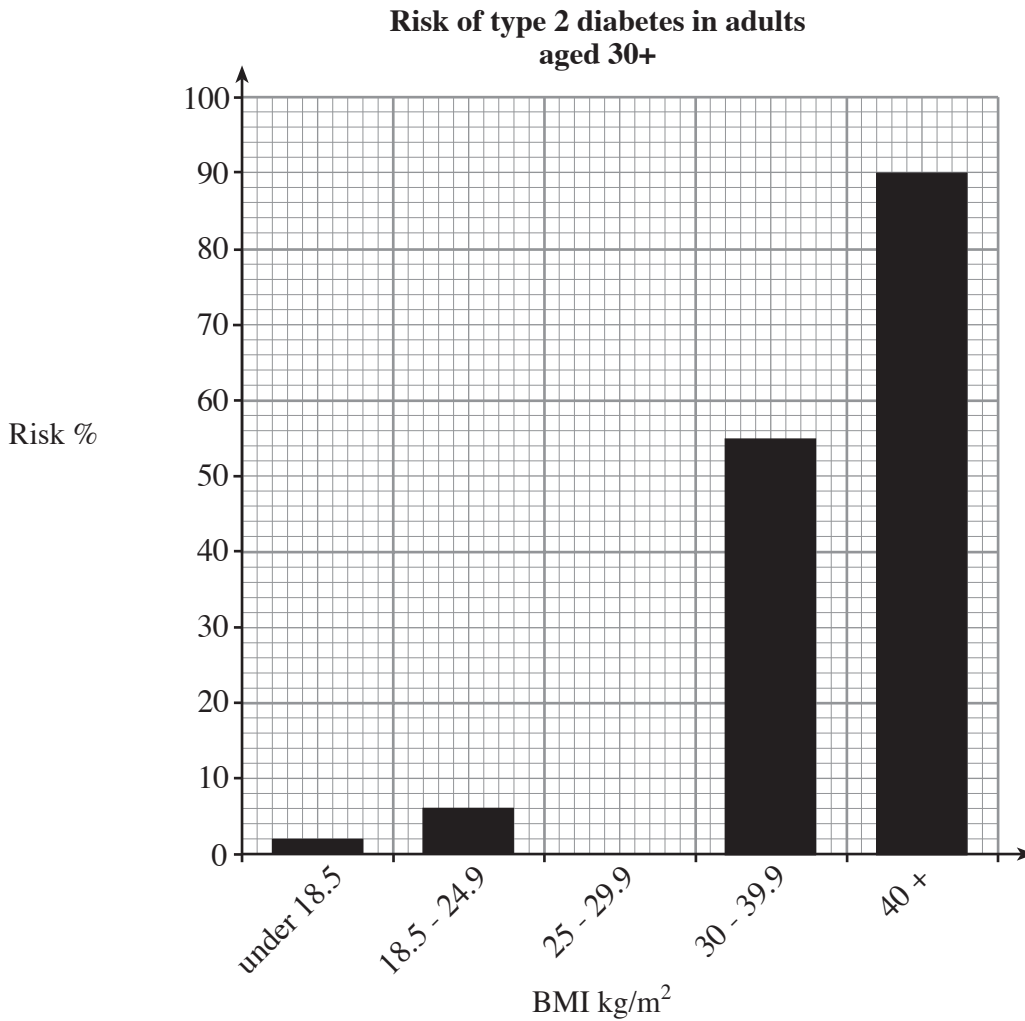
Tom's body type is

(c) The link between BMI and the risk of type 2 diabetes is shown in the table.

BMI	Risk of type 2 diabetes %
under 18.5	2
18.5-24.9	6
25-29.9	30
30-39.9	55
40+	90

(i) Use the information in the table to complete the chart below.

[1]



(ii) What is the risk of Tom developing type 2 diabetes? [1]

(iii) What is the risk of a normal weight body type developing type 2 diabetes?
..... [1]

A3

3. There are over one million fingerprint records stored in the UK.

(a) (i) **Name** the most suitable method of making a permanent record of a fingerprint. [1]

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(ii) **Name** the most suitable method of storing this number of fingerprint records. [1]

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(b) **Name** the type of fingerprint shown in **each** of the photographs below. [2]



Name

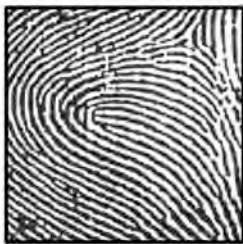


Name

(c) The fingerprint below was found at a crime scene.



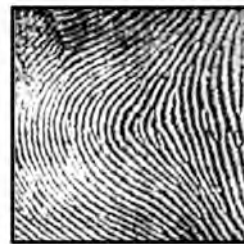
Fingerprints A, B and C come from different suspects.



A



B



C

(i) Which suspect's fingerprint is the closest match to the one found at the crime scene?

..... [1]

(ii) Fingerprints are matched by finding many identical features on both prints.

One feature has been circled on the diagram below for you.



Circle **two** more features that could be used to show a match. [2]

(d) State **one** method of protecting the crime scene so investigators do not leave their own fingerprints behind. [1]

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SECTION B (24 marks)

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

4. (i) Complete the table below to show **two** effects on the body of each vitamin deficiency. [4]

Vitamin	Effects of deficiency
C	1. 2.
D	1. 2.

- (ii) A website advertises multivitamins for a healthy lifestyle. Doctors argue that taking more than the **guideline daily amount** (GDA) regularly is a health risk because vitamins A, B and D are stored in the body.

The GDA for these vitamins is shown below.

Vitamin	GDA
A	2664 iu
B2	1.7 mg
C	62 mg
D2	200 iu

One of the multivitamin tablets advertised contains the following quantities of vitamins.

Vitamin	QUANTITY/TABLET
A	2664 iu
B2	25 mg
C	800 mg
D2	400 iu

The stated dose on the label is 'two tablets to be taken daily'.

Explain why it is not sensible to take the stated dose for these multivitamin tablets. [2]

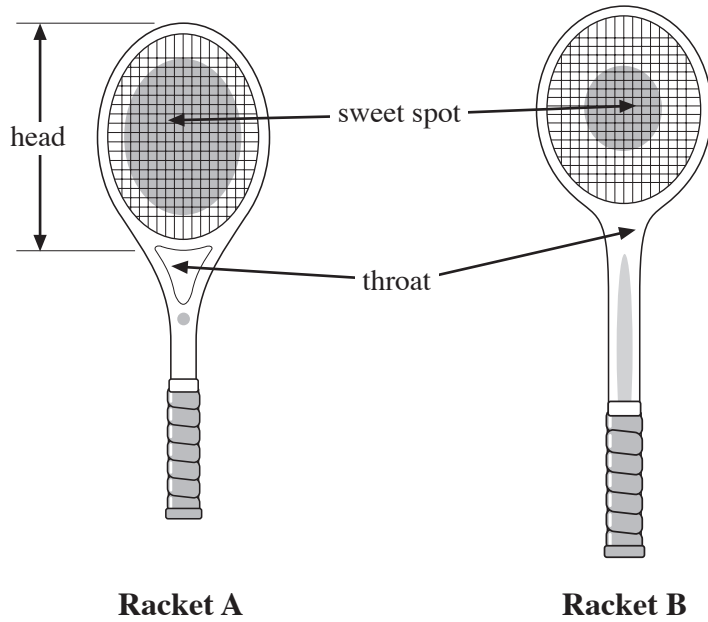
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5. The diagrams show two types of tennis rackets.



The table compares some of their properties.

	Racket A	Racket B
material	graphite composite	wood
strength of material (N/cm²)	1 400 000	10 000
mass (g)	346	520
head size (cm²)	600	450
length (cm)	68	75
string material	nylon	cow gut
throat	open	solid

(a) Give **two** design features that make racket **A** lighter than racket **B**.

[2]

1.
2.

(b) (i) The sweet spot is the area in which the strings create the most power for the least amount of effort. Give **one** reason why racket **A** has a larger sweet spot. [1]

.....

(ii) Give **one** reason why the strings can be pulled tighter between the frame in racket **A**. [1]

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(c) During play, it is important for a player to be able to hold the racket firmly. The diagram shows a rubber grip on some modern rackets.

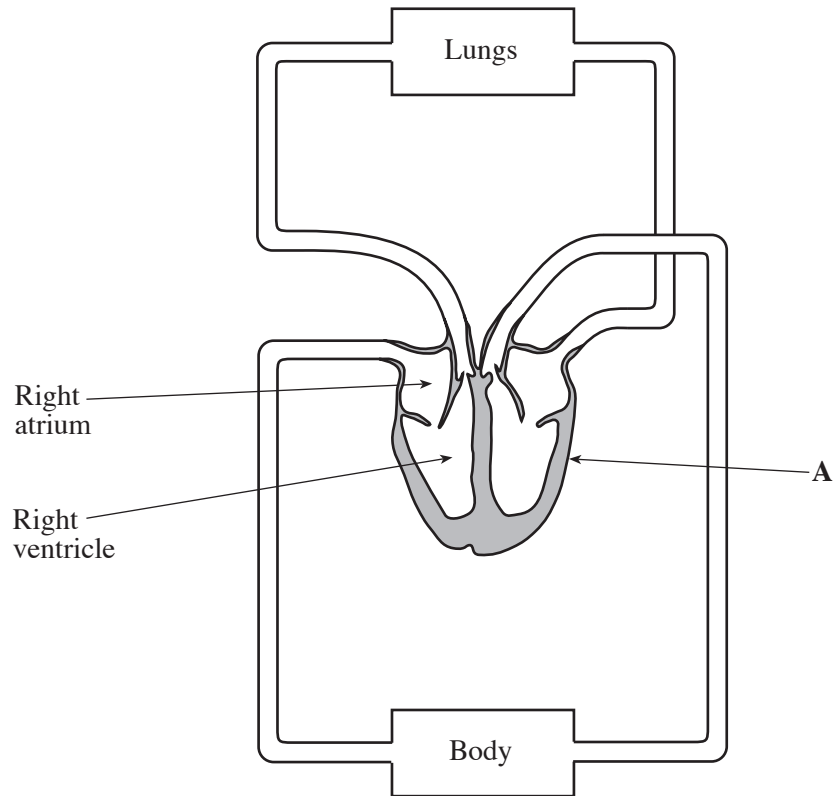


Give **two** features of this grip that allow the racket to be held firmly. [2]

1.

2.

6. The diagram shows the human cardiovascular system.



(a) (i) **Explain** why it is called a double circulation system. [2]

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(ii) **Describe** the path taken by a red blood cell as it leaves the right ventricle and eventually returns to the right atrium. [4]

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(b) **Explain** why the heart rate **and** breathing rate increase during exercise. [3]

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(c) During exercise, an athlete monitors their pulse rate and recovery time. Describe **how** recovery time is determined. [3]

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