Surname	Centre Number	Candidate Number
Other Names		0

GCSE

0682/01

ADDITIONAL APPLIED SCIENCE

UNIT 2: Science at Work in Applied Contexts
FOUNDATION TIER

A.M. MONDAY, 28 January 2013

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**4**	
2.	**8**	
3.	**8**	
4.	**6**	
5.	**10**	
6.	**12**	
Total	**48**	

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ADDITIONAL MATERIALS

In addition to this examination paper, you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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.

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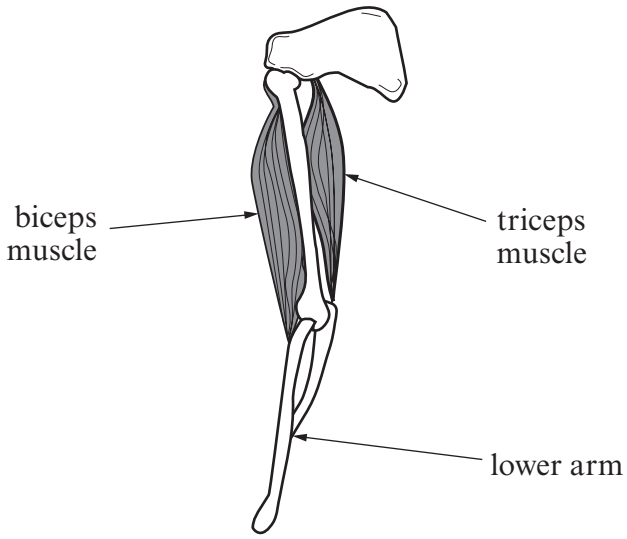
SECTION A (36 marks)

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

1. A coach is explaining to a javelin thrower how the biceps and triceps control the lower arm.



The table below gives information about the pair of muscles. Only some of the statements are correct.

Complete the table by ticking (✓) the boxes next to the **four** statements that are correct. [4]

Statement	Tick (✓) *if correct*
The triceps contract to bend the arm.	
Both muscles relax at the same time.	
Muscles pull bones.	
The muscles are called an antagonistic pair.	
When the biceps is contracted, the triceps is relaxed.	
The biceps relaxes when the arm straightens.	
Muscles push bones.	

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2. The decathlon consists of ten track and field events. One event is throwing a discus.

Two types of discus are shown below.

A – Solid rubber

B – Wood with steel rim and centre

(a) (i) Draw **four** lines to join the type of material to its properties. [3]

Type of material	Properties
Steel	Hard
Rubber	Low density
	High tensile strength
	Poor conductor

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(ii) Two of the elements used when making steel have the chemical symbols Fe and C. Name these elements: [2]

Fe .....

C .....

(b) Some properties of the different materials are shown in the table below. Use the information in the table to answer the questions that follow.

Material	Density (g/cm^3)	Mass of material in discus (g)	Volume (cm^3)	Hardness (Moh)
Rubber	1.5	2000	1333	1
Wood	0.8	600	750	1
Steel	8.0	1400		4

(i) Find the volume of steel in the discus using the equation below. [2]

$$\text{Volume} = \frac{\text{mass}}{\text{density}}$$

Volume = ... cm^3

(ii) Give **one** reason why discus **A** will wear away quicker than discus **B**. [1]

.....

.....

8

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3. Some dieticians work in hospitals. They help patients understand food labels. One dietician uses the following label from a snack.

Amount per serving 30 g			
	30 g contains	Guided daily amount (GDA)	% of daily value
Calories	100 kCal	2500 kCal	4.0
Protein	3.1g	50 g	6.2
Carbohydrates of which are sugars	20.2 g 5.1 g	300 g 40 g	6.7 12.5
Fat of which saturates	0.7 g 0.1 g	95 g 30 g	0.7 0.3
Fibre	5.0 g	25 g	20.0
Sodium Salt equivalent	0.12 g 0.25 g	2.4 g 6 g	5.0 4.2
Vitamin D	2500 IU	5000 IU	50.0
Vitamin C	15 mg	60 mg	.....

(a) **Complete** the table. [1]

(b) Use the information in the table to answer the following questions.

(i) What is the mass of a serving of this snack? ..... g [1]

(ii) How many calories does this snack contain? ..... kCal [1]

(iii) What is the GDA of sugar? ..... g [1]

(iv) If a patient ate this snack, what percentage of their daily value of fibre would they take? [1]

..... %

(c) (i) The snack contains vitamin C.

Underline two functions of vitamin C in the box below. [2]

helps the body absorb iron;	keeps the immune system healthy;
helps the body absorb calcium;	stops constipation.

(ii) The snack contains half the GDA of vitamin D. Name **one** effect of a vitamin D deficiency. [1]

.....

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Turn over.

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4. An Environmental Health Officer (EHO) visits a cafe after an outbreak of food poisoning.

(i) State **two** symptoms of food poisoning. [2]

1. .....

2. .....

(ii) Name the type of microorganism that causes food poisoning. [1]

.....

(iii) Give **one** reason why the EHO checks for hand-wash in the kitchen. [1]

.....

(iv) Give **one** reason why the temperature inside the refrigerator is checked. [1]

.....

(v) Give **one** reason why the EHO checks that cooked meat is kept away from raw meat. [1]

.....

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5. Scene of Crime Officers (SoCO) collect blood samples from a crime scene. These will be tested by a forensic scientist in a laboratory.

(a) (i) Blood contains plasma, white blood cells, red blood cells and platelets.

Complete the table to show which part of the blood carries out each function. [3]

Part of the blood	Function
.....	carries dissolved substances
.....	carries oxygen
.....	produces clots
.....	kills bacteria

(ii) The red blood cells will be used to find the blood type. Three of the blood types are A, O and AB.

What is the name of the other blood type? ..... [1]

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(iii) State **one** way in which the SoCO will prevent the blood samples from being contaminated. [1]

.....

.....

(b) DNA can be extracted from the blood sample.

(i) State **one** reason why some people are in favour of compulsory DNA testing. [1]

.....

.....

(ii) State **one** reason why some people are against compulsory DNA testing. [1]

.....

.....

(c) Paper chromatography can be used to identify dissolved substances in the blood sample. The steps in making a chromatogram are listed below in the wrong order.

A. Hang the filter paper in the beaker.

B. Pour solvent into a beaker so it will be just below the pencil line.

C. Draw a pencil line near the bottom of the filter paper strip.

D. Remove the strip and allow to dry.

E. Place a sample of the mixture on the line.

Arrange the steps in the correct order by putting the letters in the boxes below. [3]
One has been done for you.

C	.....	.....	.....	.....

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SECTION B (12 marks)

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

6. A sports nutritionist advises athletes on their **personal energy requirement**. This is given by the following equation:

Personal energy requirement = basic energy requirements (BER) + extra energy requirements.

The **daily BER** depends on body mass.

For every kilogram of body mass, we need 130 kJ of energy every day.

The **extra energy requirements** depend on how active the athlete is.

For each hour of training, the athlete needs 20 kJ of energy for each kg of body mass.

The sports nutritionist uses scales and finds the mass of an athlete is 80 kg.

(a) (i) Calculate the daily BER for the athlete. [2]

BER = ... kJ

(ii) The athlete trains for **two** hours during the day.

Calculate the extra energy requirements. [2]

Extra energy requirements = ... kJ

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(iii) What is the personal energy requirement (PER) of the athlete for the day? [1]

PER = ... kJ

(iv) Why is the personal energy requirement different for other athletes in the team? [1]

.....

.....

(b) The sports nutritionist advises the athlete of the daily diet needed to help improve performance. This is shown in the table below.

Nutrient	Daily energy supply (kJ)	kJ energy per gram of nutrient	Daily requirement of nutrient (g)
Carbohydrates	7200	15	480
Fats	3780	36	105
Proteins	1683	17	.....

(i) **Complete** the table above. [1]

(ii) Explain why the athlete is advised to increase the carbohydrate intake. [2]

.....

.....

(iii) Explain why the nutritionist recommends a low fat intake. [2]

.....

.....

(iv) What is the purpose of protein in the diet? [1]

.....

.....

END OF PAPER

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