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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

B623/01

GATEWAY SCIENCE

ADDITIONAL SCIENCE B

Unit 1 Modules B3 C3 P3 (Foundation Tier)

WEDNESDAY 26 MAY 2010: Morning

DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

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 clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Answer ALL the questions.**
- **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 number of marks is given in brackets [] at the end of each question or part question.**
- **A list of physics equations is printed on page three.**
- **The Periodic Table is provided separately.**
- **The total number of marks for this paper is 60.**

EQUATIONS

$$\text{speed} = \frac{\text{distance}}{\text{time taken}}$$

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

$$\text{force} = \text{mass} \times \text{acceleration}$$

$$\text{work done} = \text{force} \times \text{distance}$$

$$\text{power} = \frac{\text{work done}}{\text{time}}$$

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

Answer ALL the questions.

SECTION A – MODULE B3

1 Paul grows a geranium plant on his window sill.

(a) (i) Paul notices that the plant grows towards the window.

Suggest ONE reason why the plant grows towards the window.

_____ [1]

(ii) The roots grow down into the soil.

Suggest ONE reason why the roots grow down into the soil.

_____ [1]

(b) Paul takes a cutting from his geranium plant and grows a new plant from it.

Describe how Paul should do this.

Your answer should include

- **how to take a cutting**
- **how to grow the new plant.**

[3]

(c) Paul's original geranium plant has white flowers.

He expects his new geranium plant to have white flowers as well.

Explain why.

[1]

(d) When Paul's new geranium plant grows flowers, most of them are white.

However, one flower is pink.

This has been caused by a MUTATION.

What is a mutation?

[1]

[Total: 7]

2 Liz has a pig farm.

She grows the pigs for their meat.

(a) Liz wants to improve her herd of pigs using selective breeding.

She chooses a male pig to breed with her female pigs.

She chooses a male pig that produces lots of meat.

Which OTHER features would be BEST to choose?

Put ticks (✓) in TWO boxes to show your answers.

dark skin colour

fast growth rate

hairy skin

resistance to many diseases

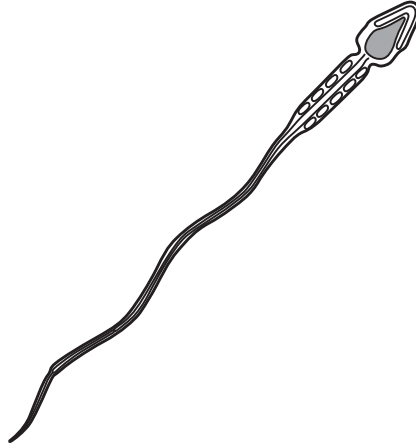
long ears

[2]

(b) Liz collects sperm cells from the male pig.

She puts the sperm cells into her female pigs.

Look at the diagram of a sperm cell.



Write down TWO ways that sperm cells are different from EGG cells.

1 _____

2 _____

[2]

- (c) Sperm cells swim to the egg cells and join with them.

The eggs then start to grow into baby pigs.

Look at the following statements about this process.

1	Sperm cells swim to the egg cells.
2	Sperm cells join with the egg cells.
3	Each egg cell grows into a ball of identical cells.
4	The identical cells start to develop into different types of cells.
5	The baby pig is born.

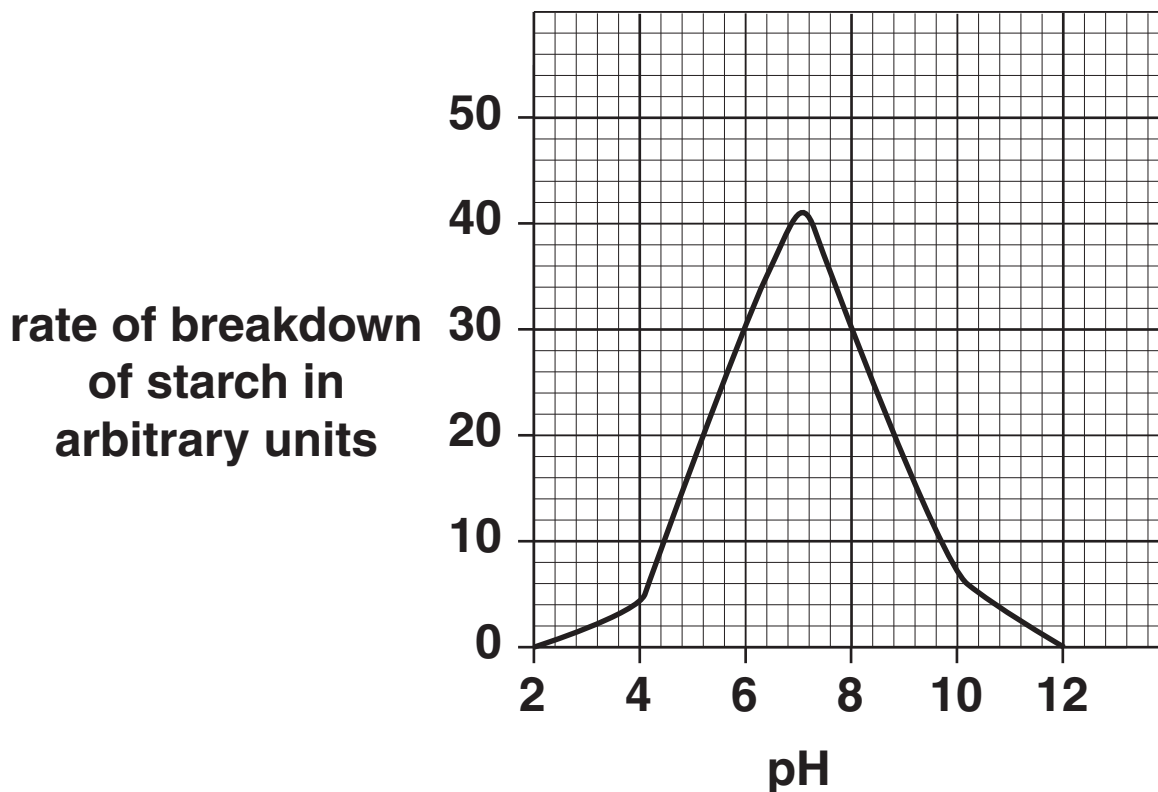
- (i) Which statement describes CELL DIFFERENTIATION? Choose 1, 2, 3, 4 or 5.
_____ [1]
- (ii) Which statement describes CELL DIVISION?
Choose 1, 2, 3, 4 or 5.
_____ [1]
- (iii) Which statement describes FERTILISATION?
Choose 1, 2, 3, 4 or 5.
_____ [1]

[Total: 7]

3 In the digestive system, the carbohydrate starch is broken down into sugar.

This begins in the mouth and uses the enzyme amylase.

(a) The graph shows how the rate of breakdown of starch by amylase changes as the pH increases.



Look at the graph.

(i) Describe how the rate of breakdown of starch changes as the pH increases.

[2]

(ii) Write down the optimum pH of amylase.

[1]

(b) Sugar is absorbed from the small intestine into the blood.

(i) Write down the name of this absorption process.

What causes sugar to be absorbed by this process?

[2]

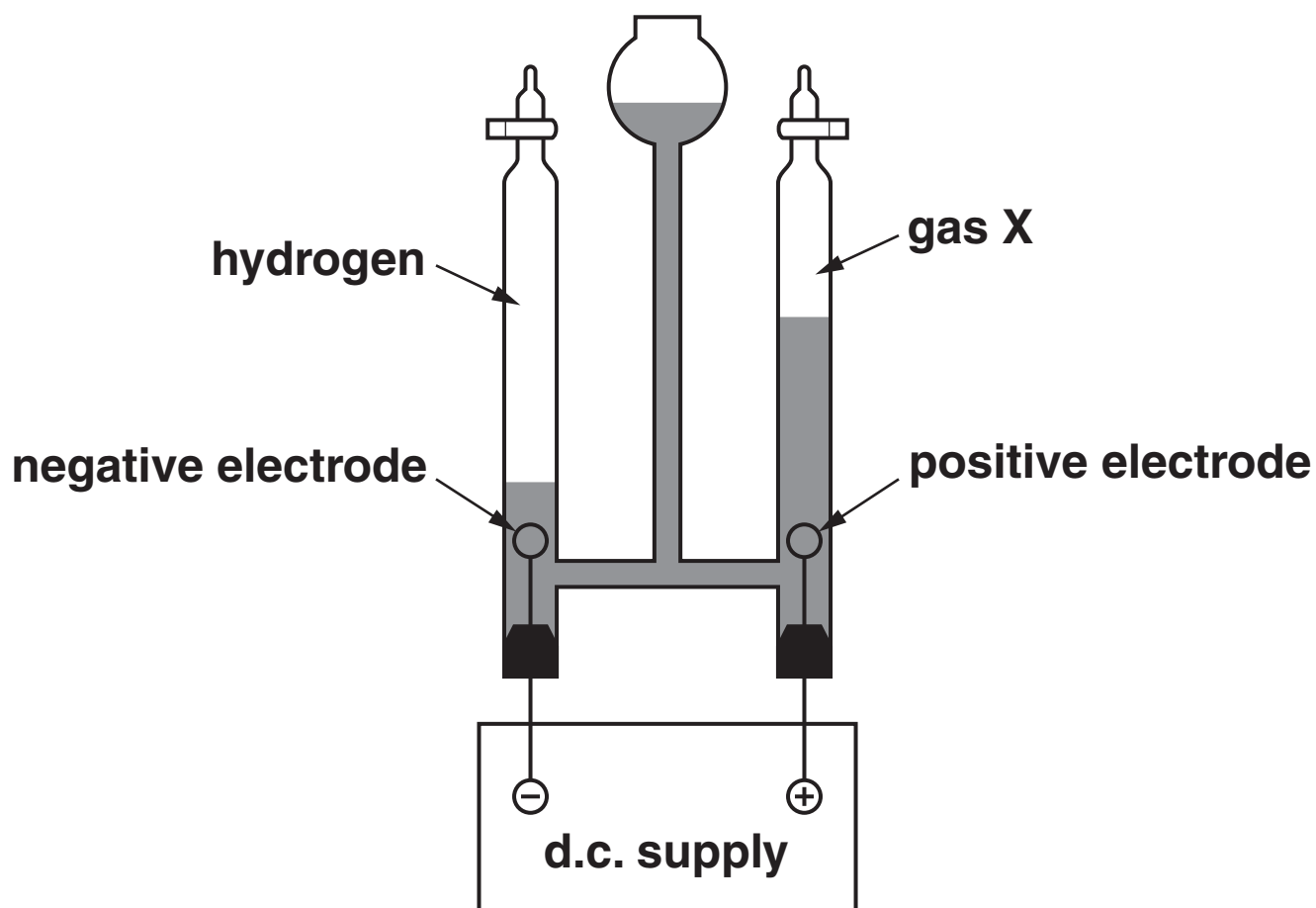
(ii) Which part of the blood transports sugar?

[1]

[Total: 6]

SECTION B – MODULE C3

- 4 Look at the diagram. It shows the apparatus used to electrolyse dilute sulfuric acid.



- (a) Hydrogen gas is made at the negative electrode.

What is the test for hydrogen gas?

[2]

- (b) What is the NAME of the NEGATIVE electrode?

[1]

(c) Gas X is made at the positive electrode.

Write down the name of gas X.

_____ [1]

(d) Look at the list of particles in dilute sulfuric acid.

H^+ SO_4^{2-} OH^- H_2O

Write down the formula of a CATION.

Choose from the list.

answer _____ [1]

[Total: 5]

- 5 Alice and Jamie investigate some reactions of the Group 7 elements.

Chlorine and bromine are Group 7 elements.

- (a) Write down the name of one OTHER Group 7 element.

_____ [1]

- (b) Look at the table.

It shows what is made when Group 7 elements react with Group 1 elements.

Complete the table.

NAME OF COMPOUND MADE IN REACTION WITH		
	chlorine	bromine
sodium	sodium chloride	_____
potassium	_____	potassium bromide

[2]

- (c) Write a WORD equation for the reaction of sodium with chlorine.

_____ [1]

(d) Write down one use of CHLORINE.

Choose from the list.

AS A FLAVOURING

AS A PRESERVATIVE

MAKING PESTICIDES

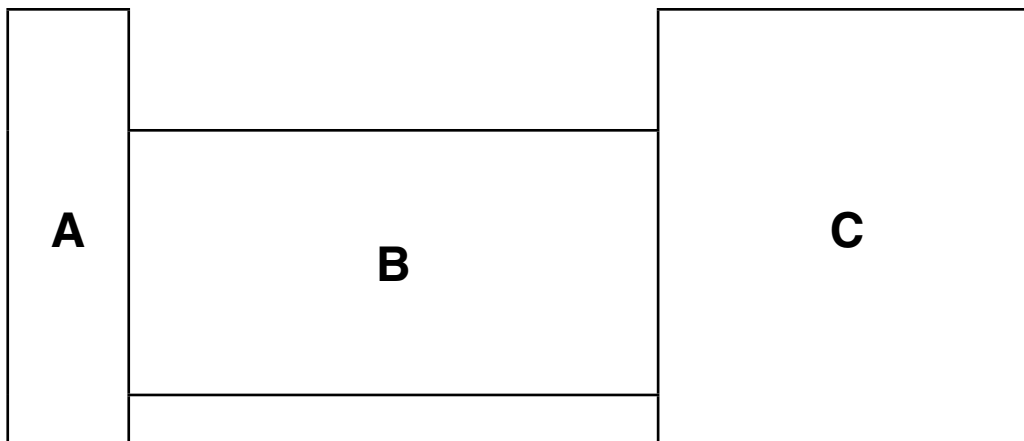
STERILISING WOUNDS

answer _____ [1]

[Total: 5]

6 This question is about transition elements.

Look at the outline of the Periodic Table.



(a) Which letter shows the transition elements in the Periodic Table?

Choose A, B or C.

answer _____

[1]

(b) The compounds of transition elements are often coloured.

Draw a straight line to match each COMPOUND to its COLOUR.

COMPOUND

COLOUR

iron(III) sulfate

orange / brown

copper sulfate

pale green

iron(II) sulfate

blue

[2]

(c) Transition elements are metals.

One property of metals is that they are shiny.

Write about OTHER properties of metals.

[2]

[Total: 5]

7 This question is about some chemicals.

(a) The formula of copper carbonate is



(i) How many different ELEMENTS are there in copper carbonate?

_____ [1]

(ii) What is the TOTAL NUMBER of atoms in the formula CuCO_3 ?

_____ [1]

(iii) Find copper, Cu, on the Periodic Table.

What is the ATOMIC NUMBER of copper?

_____ [1]

(b) Look at the table.

It gives some information about the properties of sodium chloride.

Complete the table.

ELECTRICAL CONDUCTIVITY	SOLUBILITY IN WATER	MELTING POINT
does not conduct when solid		

[2]

[Total: 5]

SECTION C – MODULE P3

8 Ibrahim is the fastest runner in his class.

He runs a 100 metre race.

(a) Other pupils in his class calculate his speed during the race.

They measure the DISTANCE he runs and the TIME he takes for the race.

What INSTRUMENTS do the pupils use to measure distance and time?

Complete the sentences.

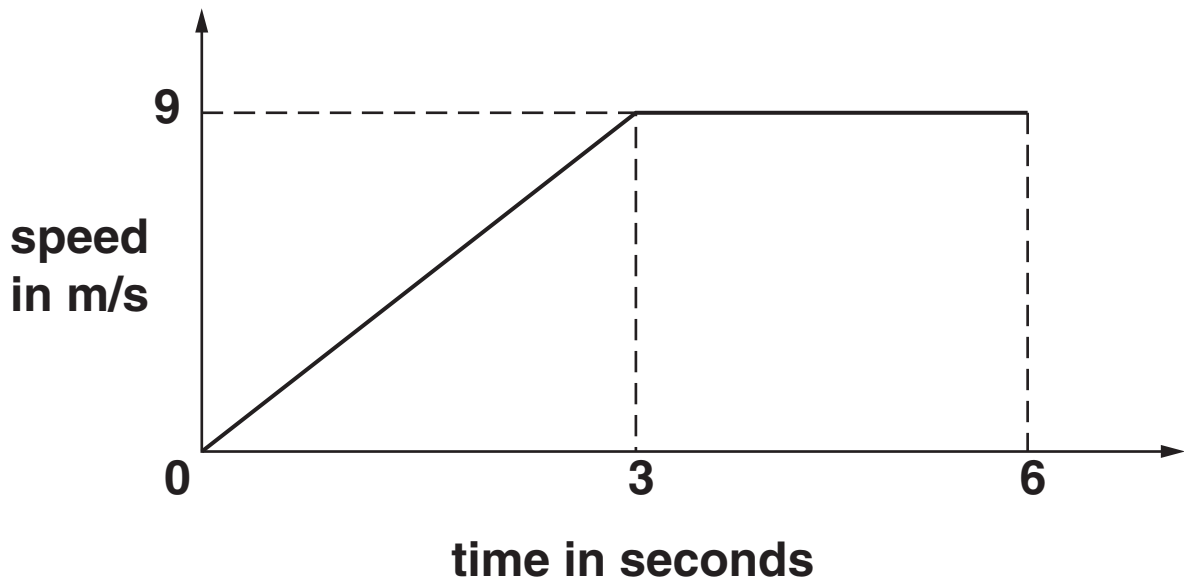
They measure distance using a

_____ .

They measure time using a

_____ . [2]

(b) Look at the graph of part of Ibrahim's race.



(i) What happens to Ibrahim's speed DURING the first 3 seconds of the race?

_____ [1]

(ii) What happens to Ibrahim's speed BETWEEN 3 and 6 seconds?

_____ [1]

(iii) After 3 seconds Ibrahim's speed is 9 metres per second (m/s).

Calculate his acceleration during the first 3 seconds.

The equations on page 3 may help you.

answer _____ m/s² [2]

[Total: 6]

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9 Julie drives her car.

Julie approaches some traffic lights.

The lights change to red (stop). She stops the car quickly.

Look at the three statements about different distances when stopping a car.

STATEMENT A	distance travelled from Julie realising she needs to brake to putting the brakes on
STATEMENT B	distance travelled from Julie putting the brakes on until the car stops
STATEMENT C	distance travelled before Julie decides she has to brake

(a) (i) Which statement best describes THINKING distance?

Choose from

STATEMENT A STATEMENT B STATEMENT C

answer _____ [1]

(ii) Which statement describes BRAKING distance?

Choose from

STATEMENT A STATEMENT B STATEMENT C

answer _____ [1]

(b) (i) When Julie applies the brakes work is done.

While the brakes are applied

- **the car travels 15 m**
- **the braking force is 4000 N.**

Calculate the work done by the brakes.

The equations on page 3 may help you.

answer _____ joules [2]

(ii) Power measures how quickly work is done.

Write down the name of the UNIT of power.

Choose from:

KILOGRAM

NEWTON

VOLT

WATT

answer _____ [1]

- (c) The traffic lights turn green. Julie pulls away from the lights.

She now drives the car at a higher speed.

Higher speed increases her braking distance. It also increases her thinking distance.

Write about OTHER factors that could INCREASE

- the braking distance
- the thinking distance.

_____ [2]

- (d) (i) Julie's car uses a fuel made from a fossil fuel.

Write down the name of ONE fuel made from a fossil fuel that the car could use.

_____ [1]

- (ii) Julie's friend Susan has a different type of car. It runs on electrical energy.

How does Susan's car get its energy?

_____ [1]

[Total: 9]

10 Many safety features of modern cars work by absorbing energy when vehicles stop suddenly.

One example of this is car brakes.

Write down two OTHER safety features in a car that absorb energy when a car stops suddenly.

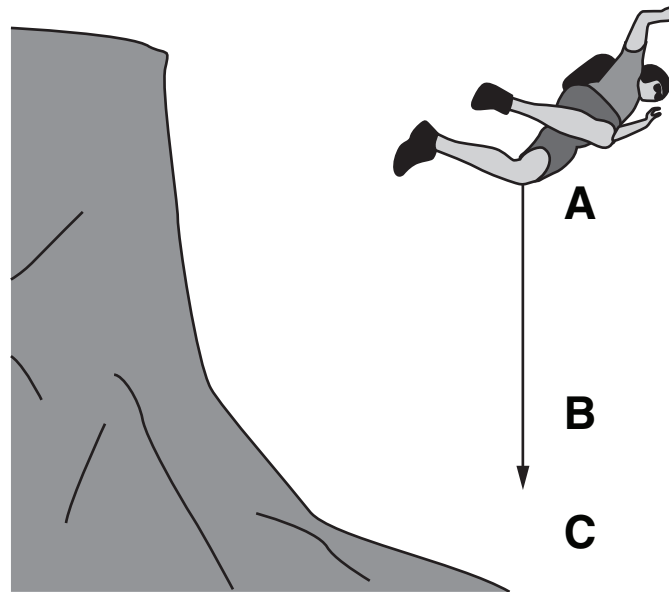
1 _____

2 _____ **[2]**

[Total: 2]

11 Kevin is a parachutist.

Look at the drawing. It shows Kevin jumping from a high mountain.



Kevin falls. He does not open his parachute yet.

(a) (i) Where will Kevin's POTENTIAL energy be the greatest?

Choose from:

A

B

C

answer _____

[1]

(ii) Where will Kevin's SPEED be the greatest?

Choose from:

A

B

C

answer _____

[1]

(b) Kevin opens his parachute. He slows down.

What is the name of the FORCE slowing Kevin down?

_____ [1]

[Total: 3]

END OF QUESTION PAPER

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