Candidate forename					Candidate surname				

Centre number					Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE
B623/01
GATEWAY SCIENCE
ADDITIONAL SCIENCE B

Unit 1 Modules B3 C3 P3 (Foundation Tier)

WEDNESDAY 30 MAY 2012: Afternoon
DURATION: 1 hour
plus your additional time allowance

MODIFIED ENLARGED

Candidates answer on the Question Paper.
A calculator may be used for this paper.

<u>OCR SUPPLIED MATERIALS:</u>
None

<u>OTHER MATERIALS REQUIRED:</u>
Pencil
Ruler (cm/mm)

<u>READ INSTRUCTIONS OVERLEAF</u>

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.

- Use black ink. HB pencil may be used for graphs and diagrams only.

- Answer <u>ALL</u> the questions.

- Read each question carefully. Make sure you know what you have to do before starting your answer.

- 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.

- An enlarged copy of the Periodic Table will be provided.

- The total number of marks for this paper is <u>60</u>.

EQUATIONS

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

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

force = mass × acceleration

work done = force × 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 **(a)** **Ranjit has poor circulation.**

His doctor says that Ranjit has a very high cholesterol level in his blood.

Which part of Ranjit's circulatory system is affected by a build-up of cholesterol?

_____ **[1]**

(b) **In the UK, the average cholesterol level is 5.7 mmol per litre of blood.**

Statins are drugs that lower cholesterol levels in the blood.

Ranjit has a cholesterol level of 8.5 mmol per litre of blood.

He takes a statin that lowers his blood cholesterol level by 40%.

(i) **Calculate how much lower his blood cholesterol will be than the UK average.**

_____

_____

answer _____ mmol per litre of blood [3]

(ii) The doctor says Ranjit's genes may be involved in his high cholesterol levels.

What are genes made of?

_____ [1]

(c) Statins are taken as tablets that are swallowed.

Statins are absorbed in the small intestine by diffusion.

Describe what is meant by diffusion.

_____

_____ [1]

[Total: 6]

2 **Look at the picture.**

It shows outlines, labelled A to E, of five male humans.

They show different phases of human growth.

A   B   C   D   E
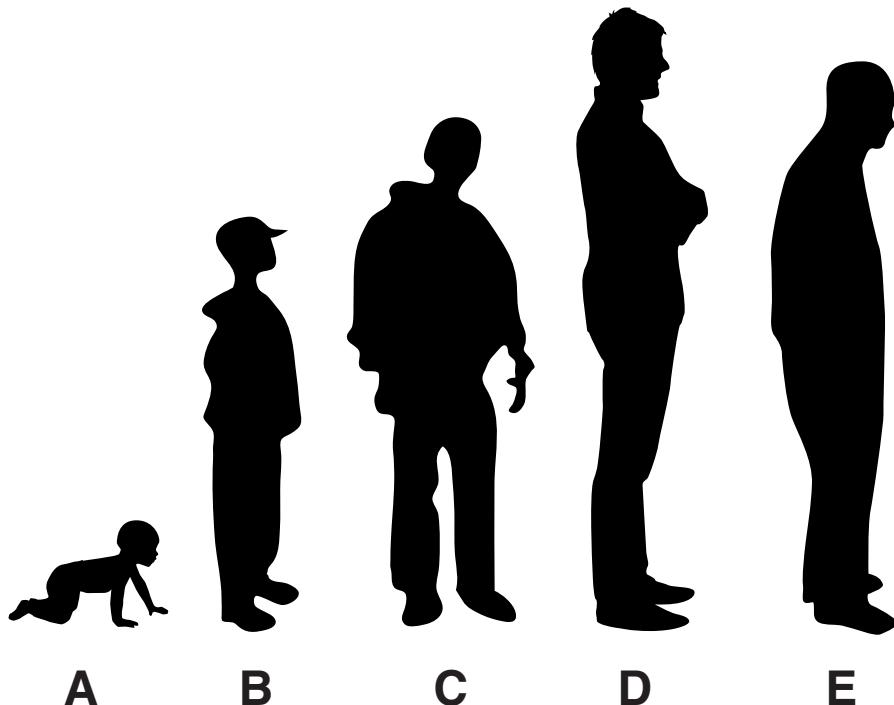
(a) Match each letter to the correct human growth phase.

One has been done for you.

HUMAN GROWTH PHASE	LETTER
adolescence	C
childhood	
infancy	
maturity	
old age	

[2]

(b) Look at the table.

It shows the gestation period (length of pregnancy) of different mammals.

MAMMAL	GESTATION PERIOD IN DAYS
dog	61
hamster	16
human	266
rhino	480
sea lion	360

(i) During the gestation period CELL DIFFERENTIATION occurs.

What is cell differentiation?

_____

_____ [1]

(ii) Suggest why the gestation periods for different mammals are NOT the same.

_____

_____ [1]

(c) During gestation the developing foetus is supplied with oxygen from the mother's blood.

An organ develops between the foetus and mother to speed up the supply of oxygen.

(i) Write down the name of this organ.

_____ [1]

(ii) What part of the blood carries oxygen?

_____ [1]

**(d)** After 112 days of pregnancy, the small intestine of a human foetus is fully developed.

The small intestine is only used after birth.

Explain why the small intestine is NOT used until after birth.

_____

_____ [1]

[Total: 7]

3   Look at the drawing of a strawberry plant.
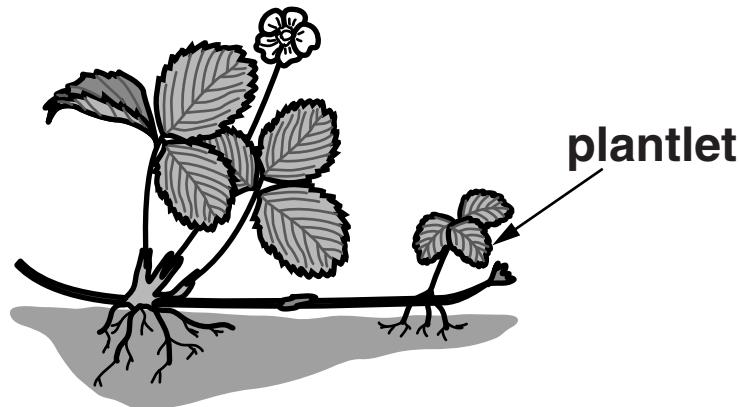
plantlet

(a) Strawberry plants can reproduce using flowers.

They can also reproduce using plantlets.

Name the type of reproduction used to produce the plantlet.

_____ [1]

(b) The plantlets produce roots.

The roots will always grow in a downward direction in response to a stimulus.

What is the stimulus?

Put a tick (✓) in the box next to the correct answer.

carbon dioxide ☐

food ☐

gravity ☐

oxygen ☐

salt ☐   [1]

(c) When new strawberry plants develop, cell division occurs.

Cell division also occurs throughout the life of the strawberry plant.

Explain why cell division is important for the strawberry plant.

_____

_____

_____

_____

_____ **[3]**

(d) Scientists can produce strawberry plants that survive freezing temperatures.

Strawberries can now be grown in parts of the world where they could not be grown before.

Finish these sentences about the process the scientists use.

Choose words from this list.

BREED   INSERT   MODIFICATION

MULTIPLICATION   MUTATE   RESISTANCE

Putting genes from one organism into another is

called genetic _____ .

Scientists select the desired antifreeze

characteristic from an arctic fish and isolate that

gene. The scientists then _____

the antifreeze gene into the cells of the strawberry

plant.   [2]

[Total: 7]

SECTION B – MODULE C3

4   This question is about atoms.

(a) The diagram shows the particles in a carbon atom and their charges.
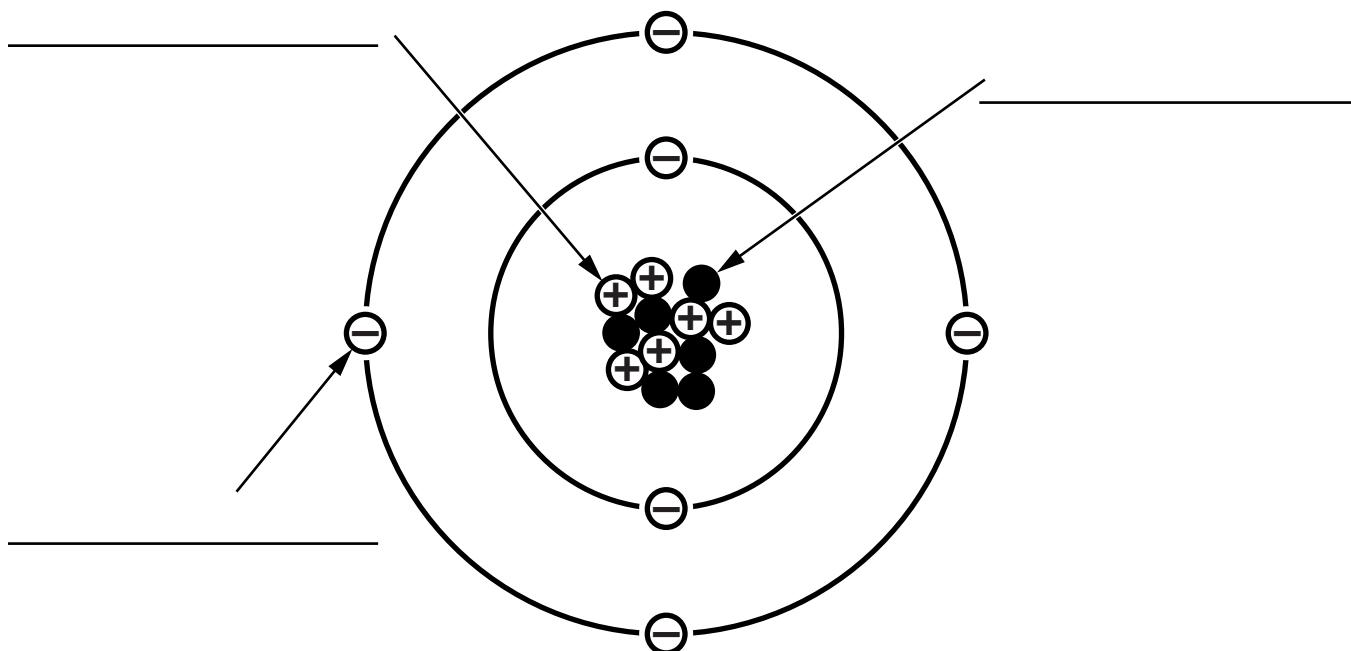
(i) Complete the labels on the diagram.   **[2]**

(ii) Write down the MASS NUMBER of this carbon atom.

_____[1]

(b) Carbon can react with oxygen to form carbon dioxide, CO_2.

Carbon is a solid. Oxygen is a gas.

What is the STATE of carbon dioxide at room temperature?

_____ [1]

(c) Write down the NAME of an element in the same GROUP of the Periodic Table as carbon.

Use the enlarged Periodic Table provided to help you.

_____ [1]

[Total: 5]

5 This question is about Group 1 metals.

Read the following newspaper article.

SODIUM BLAZE AT FACTORY

A large drum containing sodium metal burst into flames when it reacted with rainwater at a factory. The factory owner believes that the sodium, which is normally stored under oil, had been left uncovered outside by accident.

A fireman who put out the fire said, "These Group 1 metals are very dangerous."

(a) What NAME is given to the Group 1 metals?

_____ [1]

(b) Group 1 metals are stored under oil.
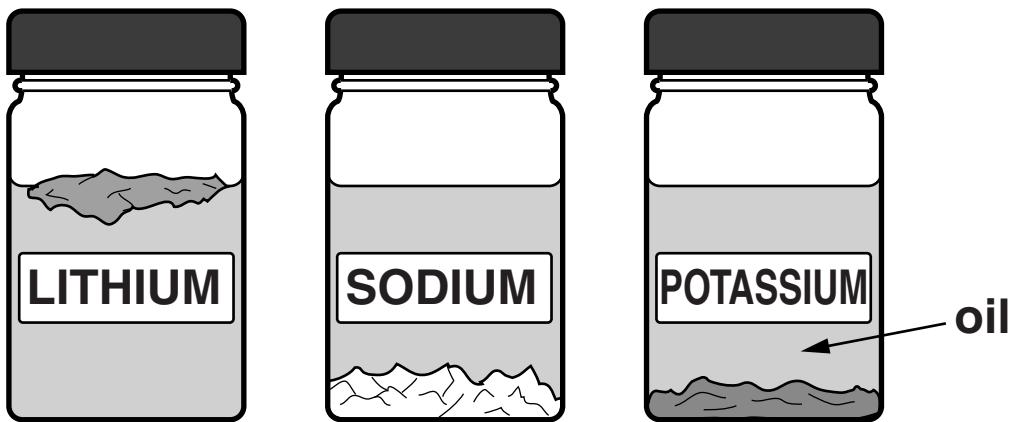
Explain why.

_____

_____ [2]

(c) Group 1 metals can be identified using a flame test.

Draw a straight line from each METAL to the correct FLAME COLOUR.

You should only draw THREE lines.

METAL	FLAME COLOUR
sodium	red
lithium	lilac
potassium	yellow

[2]

[Total: 5]

6 Look at the table opposite.

It shows some properties of Group 7 elements.

(a) Complete the table. **[2]**

(b) Write down a USE for chlorine.

Choose from this list.

ELECTROLYTE

FLAVOURING

MAKING PLASTICS

PRESERVATIVE

STERILISING WOUNDS

answer _____ **[1]**

(c) In the table, the Group 7 elements are listed in order of their reactivity.

Look at the equation. It shows a displacement reaction of a Group 7 element.

chlorine + sodium bromide → sodium chloride + bromine
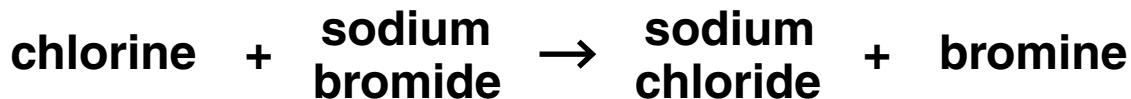
Write a WORD EQUATION for the reaction between bromine and sodium iodide.

_____ **[1]**

[Total: 4]

ELEMENT	MOLECULAR FORMULA	STATE AT ROOM TEMPERATURE	COLOUR	ORDER OF REACTIVITY
fluorine	F_2	gas	pale yellow	most reactive
chlorine	Cl_2		pale green	
bromine	Br_2	liquid		
iodine	I_2	solid	grey	
astatine	At_2	solid	black	least reactive

7   This question is about metals.

Look at the table opposite. It shows the properties of some metals.

(a) Which metal has the HIGHEST density?

answer _____ [1]

(b) A factory owner needs 4 tonnes of aluminium to build an extension.

Work out the cost of buying 4 TONNES of aluminium.

_____

_____

answer _____ [1]

(c) Metals have HIGH MELTING POINTS.

Put a tick (✓) next to the statement which explains why metals have high melting points.

Metals have electrons that can move.   ☐

Metals have particles in a regular arrangement.   ☐

Metals have strong metallic bonds.   ☐

Metals are superconductors.   ☐   [1]

METAL	MELTING POINT IN °C	DENSITY IN g/cm³	RELATIVE ELECTRICAL CONDUCTIVITY	COST PER TONNE IN £
aluminium	660	2.7	40	1350
copper	1083	8.9	64	3800
iron	1535	7.9	11	400
silver	962	10.5	67	20 000
zinc	420	7.1	18	870

(d) Aluminium is extracted from its mineral, bauxite, using electricity.

What is the name of this process?

Choose from this list.

ELECTROLYSIS

OXIDATION

PRECIPITATION

THERMAL DECOMPOSITION

answer _____ [1]

(e) (i) Copper is extracted from its ore. The ore is called chalcopyrite.

Chalcopyrite has the formula $CuFeS_2$.

How many ATOMS are in the formula $CuFeS_2$?

answer _____ [1]

(ii) One type of iron ore has the formula $FeCO_3$.

Write down the NAMES of the elements in $FeCO_3$.

The enlarged Periodic Table provided may help you.

_____ [1]

[Total: 6]

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8 **This question is about speed and acceleration.**

Look at the drawing. It shows the two runways at Manchester Airport. A road passes through tunnels underneath the runways.

The tunnels are of equal length.
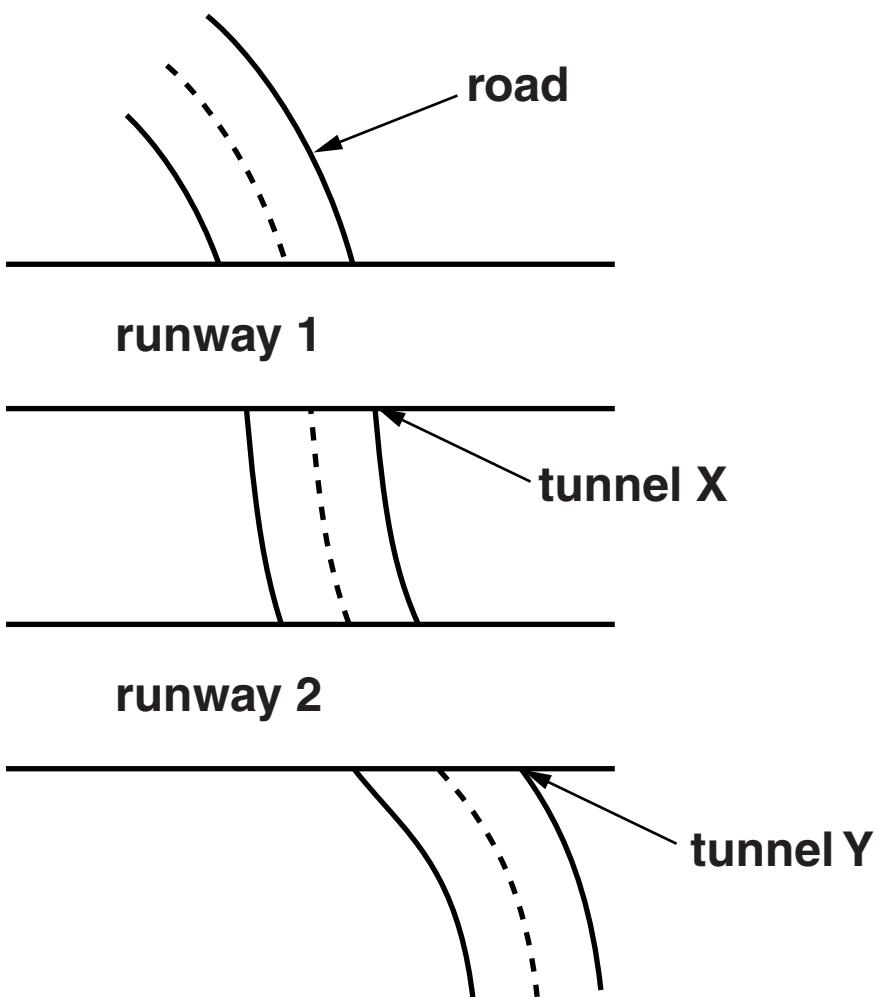
(a) Look at the information Katy collects about five cars passing through the tunnels.

CAR	TIME TAKEN TO DRIVE THROUGH TUNNEL X IN SECONDS	TIME TAKEN TO DRIVE THROUGH TUNNEL Y IN SECONDS
A	20	22
B	25	24
C	27	27
D	27	21
E	23	26

(i) Which car travelled at the SAME speed through both tunnels?

Choose from   A   B   C   D   E

answer _____   [1]

(ii) Which car travelled FASTEST through tunnel Y?

Choose from   A   B   C   D   E

answer _____   [1]

(b) Katy wants to calculate the speed of cars travelling through the tunnels.

   (i) The table shows the time taken.

      What else does she need to measure?

      _____

      _____ **[1]**

   (ii) What equipment does she need to do this?

      _____

      _____ **[1]**

(c) Katy buys a new car.

It has a mass of 900 kg.

The car can accelerate from 0 to 20 m/s in 4 seconds.

Calculate the accelerating FORCE.

The equations on page 3 may help you.

_____

_____

_____

answer _____ N   **[3]**

(d) The graph shows how the speed of Katy's car changes with time.

Look at the graph.
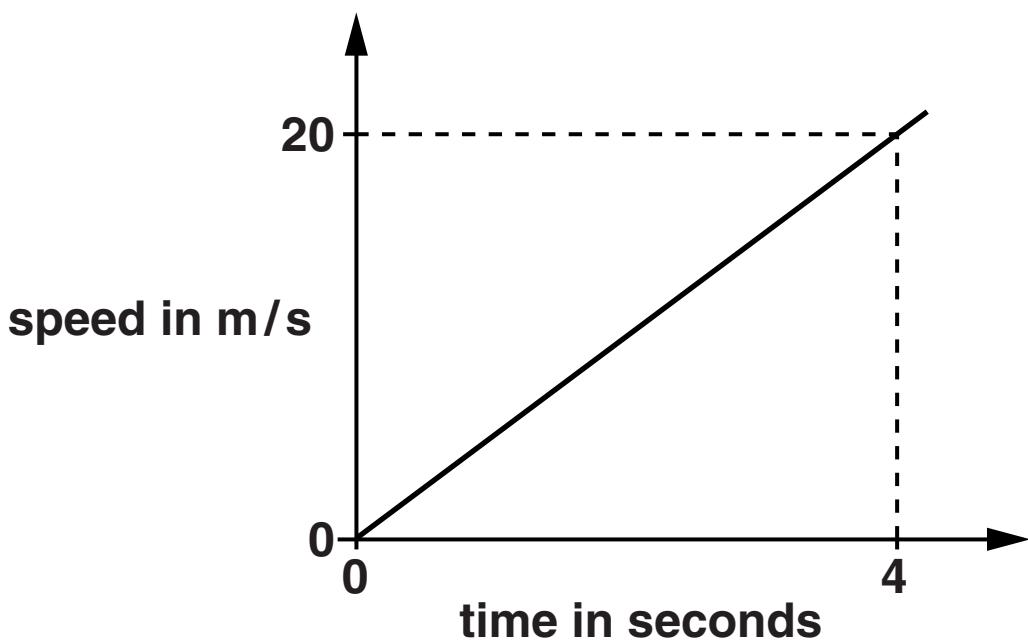
How can she use the graph to find the DISTANCE travelled in the first four seconds?

_____

_____

_____ **[1]**

[Total: 8]

9   **Jenny drops a ball from a cliff.**
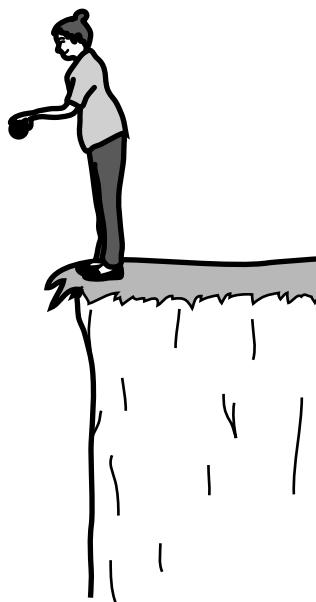
(a) Write about what happens when the ball falls.

   Your answer should include

   - **the name of the force causing the ball to fall**

   - **the direction of this force**

   - **what happens to the speed of the ball as it falls.**

   _____

   _____

   _____

   _____

   _____ **[3]**

(b) What sort of energy does the ball gain as it falls?

_____

_____ [1]

[Total: 4]

10 (a) **THINKING DISTANCE is the distance travelled by a car between the need for braking occurring and the brakes starting to act.**

What is meant by BRAKING DISTANCE?

_____

_____

_____ [1]

(b) **How is STOPPING DISTANCE related to braking distance and thinking distance?**

_____

_____ [1]

(c) **Put ticks (✓) in the boxes to show which distance is affected by each condition in the table.**

The first one has been done for you.

CONDITION	THINKING DISTANCE	BRAKING DISTANCE
increased speed	✓	✓
icy road		
bald tyres		
tired driver		
driver has drunk alcohol		

[2]

(d) Modern cars have many safety features.

Many of these features ABSORB ENERGY when a car stops.

These are very important in an accident.

Write down TWO car safety features that absorb energy in an accident.

_____

_____

_____ **[2]**

[Total: 6]

11 (a) Leo has some workers in his garden.

MIKE is loading a wheelbarrow with sand.

NICK is digging in the garden.

PHIL is climbing some steps.

JOHN is sitting on a ride-on mower.

Which person is doing the LEAST work?

Choose from   MIKE   NICK   PHIL   JOHN

answer _____ [1]

(b) Leo measures how much work each person does.

What else must he measure to find out which person develops the most power?

_____ [1]

[Total: 2]

END OF QUESTION PAPER

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