

FOR OFFICIAL USE

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G

KU

PS

Total Mark

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3700/402

NATIONAL
QUALIFICATIONS
2011

MONDAY, 23 MAY
10.20 AM – 11.35 AM

SCIENCE
STANDARD GRADE
General Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

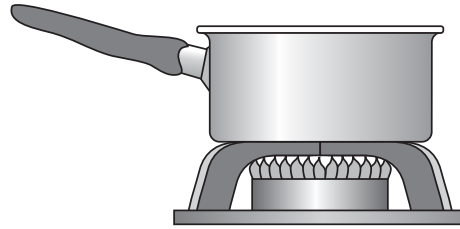
- 1 Answer as many questions as you can.
- 2 Read the whole of each question carefully before you answer it.
- 3 Write your answers in the spaces provided. Showing working may help in some questions.
- 4 Before leaving the examination room you must give this book to the Invigilator. If you do not, you may lose all the marks for this paper.



Marks		KU	PS
1			
1			
1			
1			
1			

2. Which of the lists below shows materials that can **all** be used to make pans for cooking food on a gas hob?

- A paper, plastic, glass
- B plastic, paper, ceramic
- C metal, glass, paper
- D ceramic, glass, metal



Underline the correct answer.

3. The boxes below show parts of the circulatory system.

1	valve	2	artery	3	white blood cell
4	capillary	5	red blood cell	6	vein

Which box shows the part that

(a) carries blood away from the heart?

Box

(b) prevents blood from flowing backwards?

Box

(c) allows exchange of gases with body cells?

Box

(d) destroys bacteria?

Box

[Turn over

Marks

KU	PS
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9. Different **types of coal** have different **moisture content (%)**.

The **heat output (kW/kg)** depends on the type of coal.

Anthracite coal has a moisture content of 15%. The heat output of anthracite is 9 kW/kg. Bituminous coal has a higher moisture content of 20% and gives out 7.5 kW/kg. The heat output of lignite coal is 6 kW/kg and it has a moisture content of 30%. Brown coal has the lowest heat output, 5 kW/kg, and at 45%, it has the highest moisture content.

Show this information in a table with **three** suitable headings.

3

[Turn over

Marks	KU	PS
1		
2		
1		
1		
1		

10. (continued)

(d) The number of starfish depends on natural factors.
One natural factor is the amount of food available.

Give **one** other natural factor that controls the number of living things in an area.

.....

(e) Complete the sentences below by **circling** the correct word in each box.

Green plants use

chemical	light
----------	-------

 energy to make their own food.

This food is stored as

starch	protein
--------	---------

.

11. Use the words in the boxes to answer the questions below.

crimping	quenching	electroplating
galvanising	corrosion	anodising

Which word describes

(a) covering steel with a layer of zinc?

.....

(b) changing the shape of fibres to increase the insulating properties?

.....

(c) the gradual breakdown of a metal due to a chemical reaction at its surface?

.....

[Turn over

Marks

KU	PS
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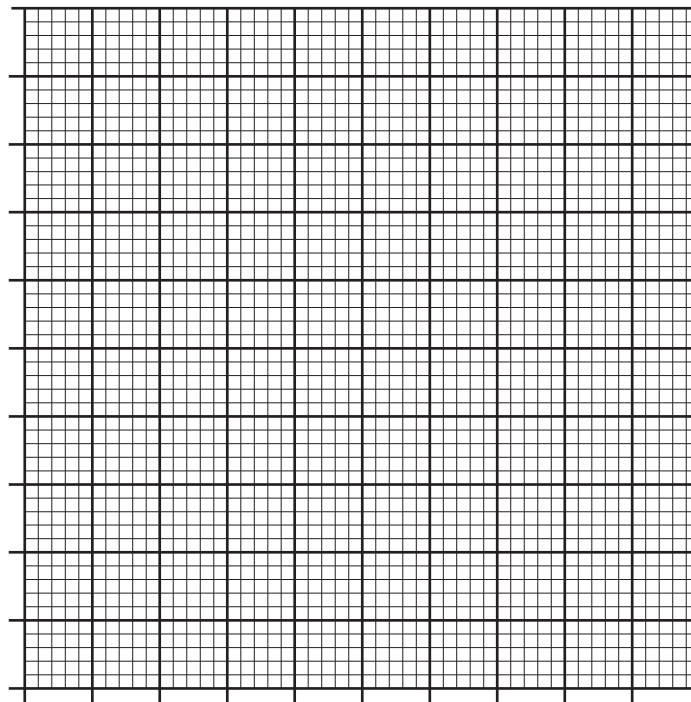
12. The table shows the tensile strength of four materials.

<i>Material</i>	<i>Tensile strength (MPa)</i>
Aluminium	80
Polypropene	36
Nylon	72
Solder	45

Present this information as a **bar graph**.

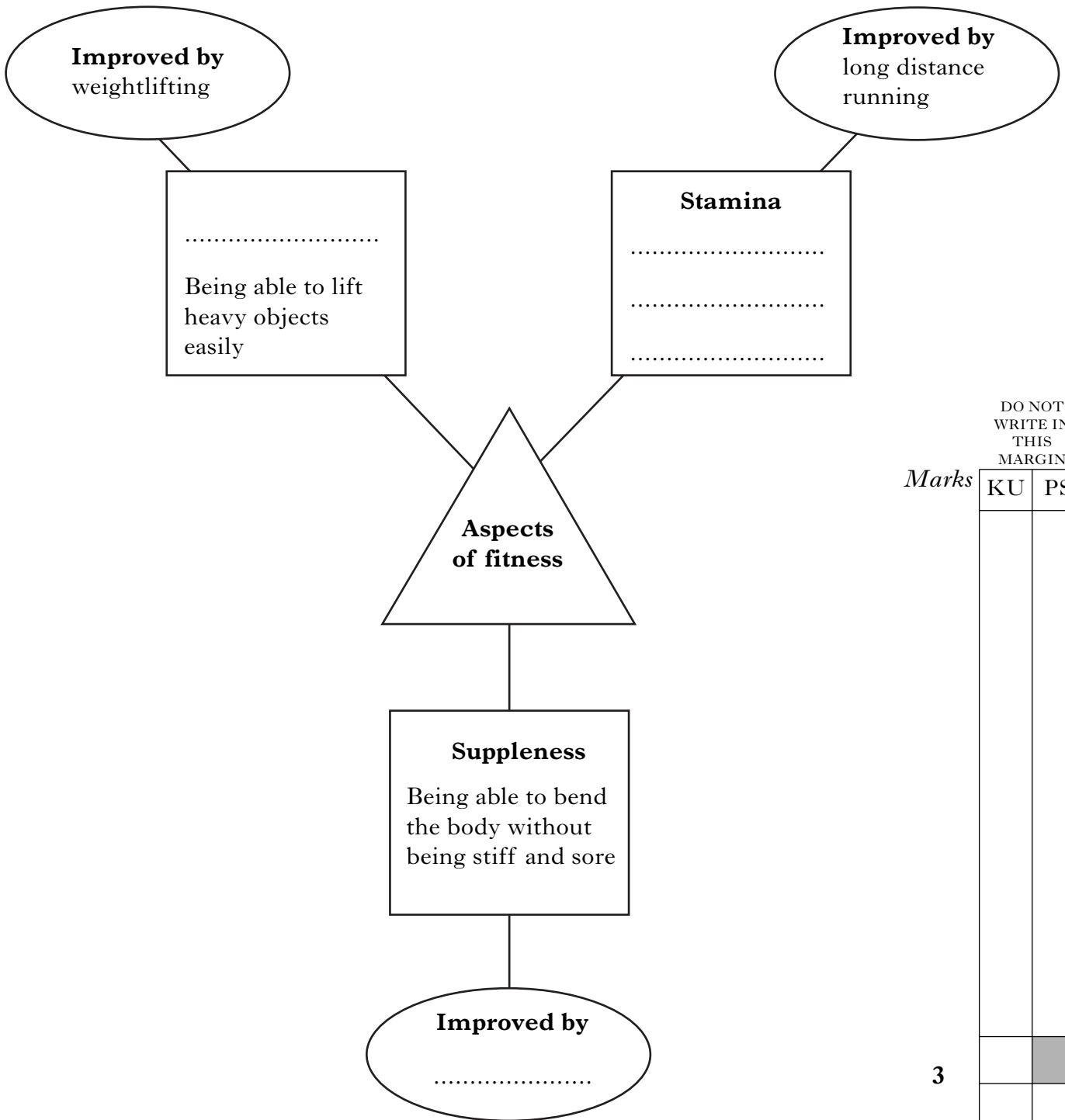
(Additional graph paper, if required, can be found on *Page twenty-four*).

Tensile
strength
(MPa)



3

13. Complete the diagram which describes the different aspects of fitness and examples of sports which can improve each aspect.

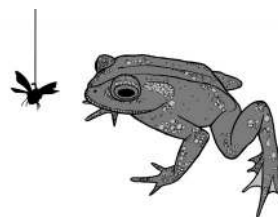






DO NOT WRITE IN THIS MARGIN

Marks	KU	PS
3		

[Turn over

14. Toads feed on insects. They will only snap at and eat moving insects. During an investigation a hungry toad was offered insects hanging on a thread.



<i>Type of Insect</i>	Black Fly	Bee	Yellow Fly	Robber Fly
<i>Description of Insect</i>	all black	black and yellow stripes	all yellow	black and yellow stripes
	harmless	stings	harmless	harmless
<i>Picture of Insect</i>				

The order in which the insects were offered and the hungry toad's response is shown below.

<i>Order of experiments</i>	<i>Insect offered</i>	<i>Hungry toad's response to insect</i>
1	Black fly	snaps at and eats it
2	Yellow fly	snaps at and eats it
3	Robber fly	snaps at and eats it
4	Bee	snaps at and is stung
5	Robber fly	crouches down and avoids it
6	Yellow fly	snaps at and eats it
7	Robber fly	crouches down and avoids it
8	Black fly	snaps at and eats it

Marks

KU	PS

17. Grant investigated the strength of a model bridge.



When six 25 g and four 5 g masses were placed on the bridge, it collapsed.
Calculate the total mass placed on the bridge.

Space for working

Answer..... g

2

18. The box below shows some of the basic needs of humans.



Humans change their environment to meet these needs.

Which need is being met by

(a) ploughing land to grow crops?

.....

1

(b) building dams and reservoirs?

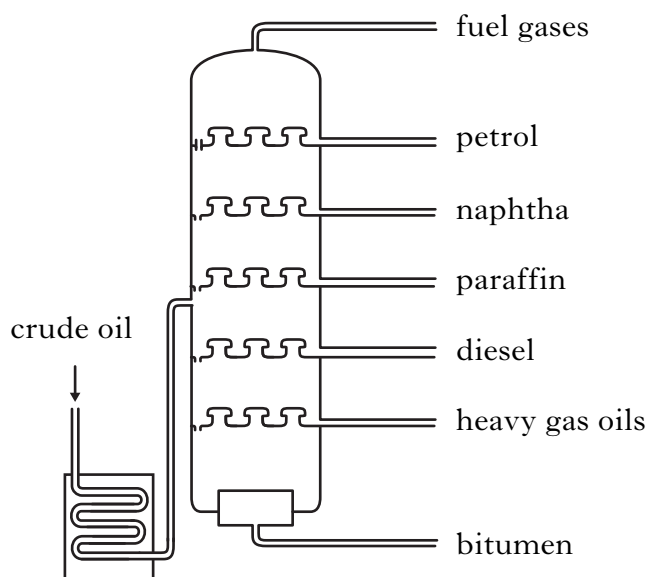
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1

[Turn over

Marks	Marks	
	KU	PS
1		
1		
1		

19. Crude oil is separated into different fractions in a fractionating column.



(a) Name the fraction shown in the diagram which is used to make

(i) road tar.

.....

1

(ii) plastics.

.....

1

(b) Which of these statements is correct?

- A Petrol is more viscous than diesel.
- B Paraffin is less flammable than petrol.
- C Diesel is less viscous than paraffin.
- D Diesel is more flammable than petrol.

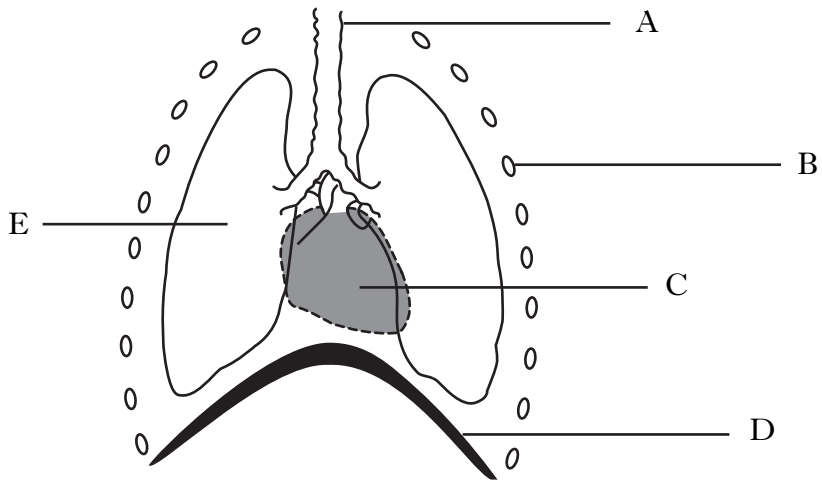
Underline the correct answer.

1

Marks

KU	PS

21. The diagram below shows the heart and parts of the human breathing system.



Use the letters from the diagram to answer the following questions.

Which part

(a) moves downwards and inwards when we breathe **out**?

Letter

1

(b) moves downwards when we breathe **in**?

Letter

1

Marks

KU	PS
----	----

22. Ammonia is an important gas used to make fertilisers.

The table shows some information about the process used to make ammonia.

<i>Temperature (°C)</i>	<i>Pressure (bar)</i>	<i>Rate of ammonia production (kg/min)</i>
1000	100	50
750	100	140
500	100	270
500	150	320
500	200	410

(a) Draw **two** conclusions from this information.

- 1
-
- 2
-

2

(b) Predict the rate of ammonia production when the temperature used is 600°C and the pressure is 100 bar.

..... kg/min

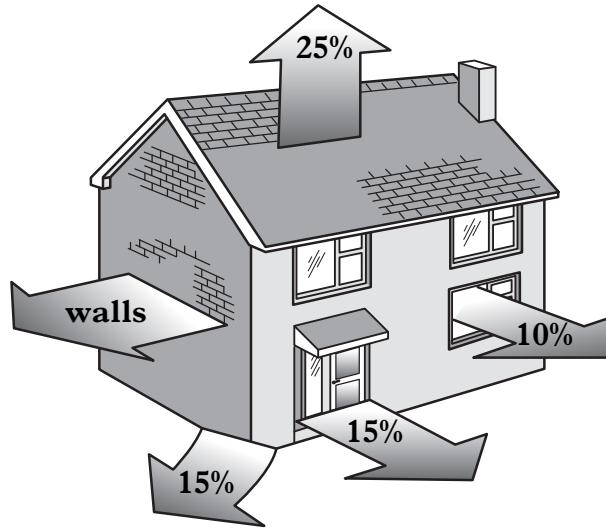
1

[Turn over

Marks

KU	PS
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23. Heat energy is lost from five parts of a house as shown in the diagram below.



(a) What percentage of energy is lost through the **walls**?

Space for working

Answer %

2

(b) The total energy lost from the house was 3000 kJ.
Calculate the amount of energy lost through the **roof**.

Space for working

Answer kJ

1

Marks

KU	PS
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24. Some properties of materials are shown below.

good elasticity	good wear resistance
poor wear resistance	poor thermal conductivity
good thermal conductivity	poor flexibility

Choose the **most** important property from the box to complete the table below.

<i>Product</i>	<i>Material it is made from</i>	<i>Most important property of the material</i>
duvet	duck feathers	
carpet	nylon	

2

25. Hens living in a group often peck each other.

In an experiment, four hens were tagged with a leg ring marked A, B, C or D.

The number of times the hens pecked each other was recorded.

The results are shown in the table below.

		Number of pecks given by bird			
		A	B	C	D
Number of pecks received by bird	A		6	12	4
	B	2		10	2
	C	0	0		0
	D	11	19	15	

From the results, put the hens in increasing number of pecks received. The first one has been done for you.

C			
---	--	--	--

increasing number of pecks received

1

Marks

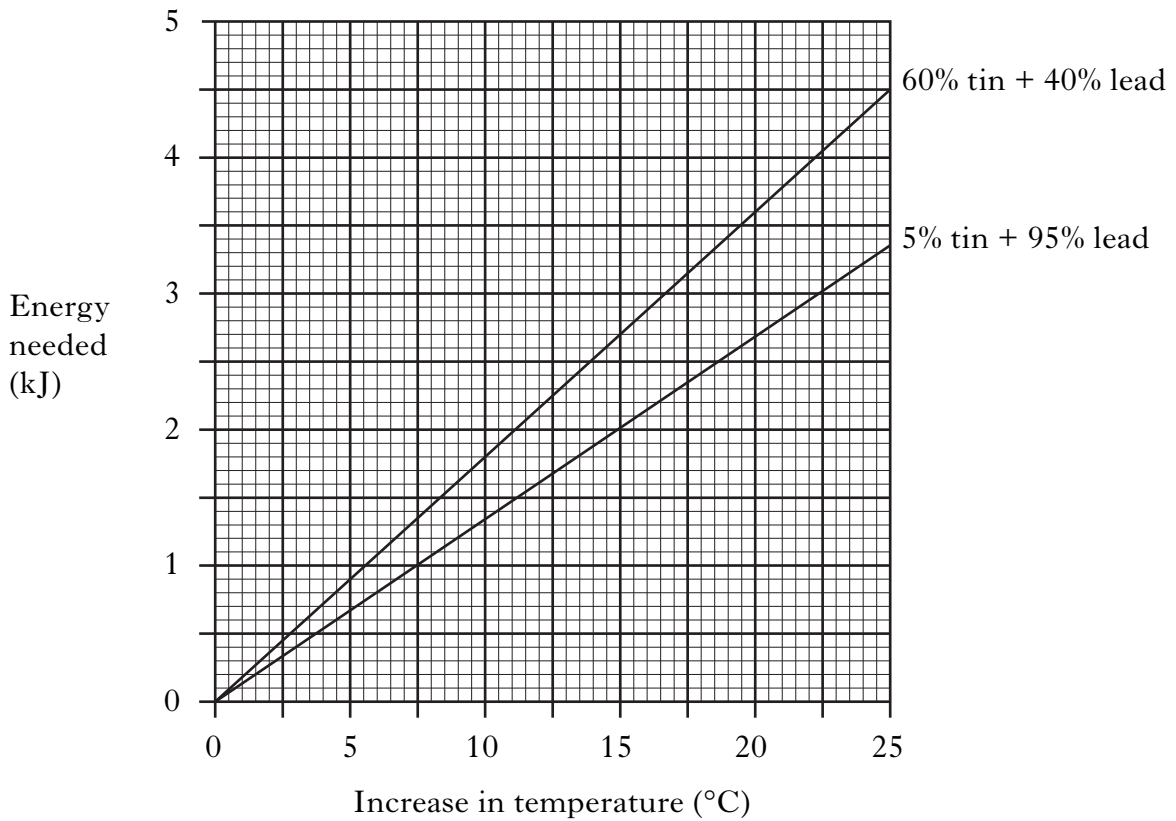
	KU	PS
1		
2		
1		

26. Solder is a mixture of two metals, tin and lead.

(a) What word is used to describe a mixture of metals?

.....

(b) Alasdair heated two different types of solder and measured the energy needed to increase the temperature of each solder.



(i) Draw **two** conclusions from Alasdair's results.

1

.....

2

.....

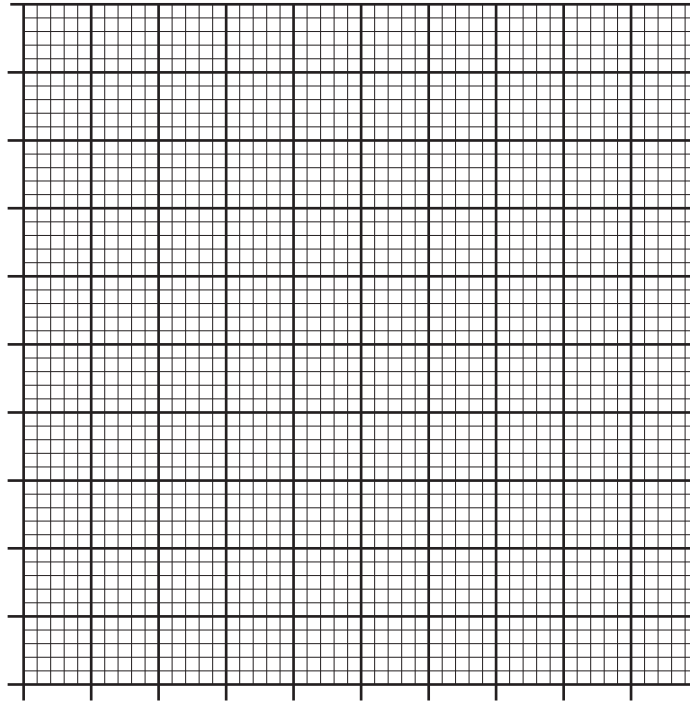
(ii) Another type of solder is made of 30% tin and 70% lead.

Predict the energy needed to increase the temperature of this solder by 15 °C.

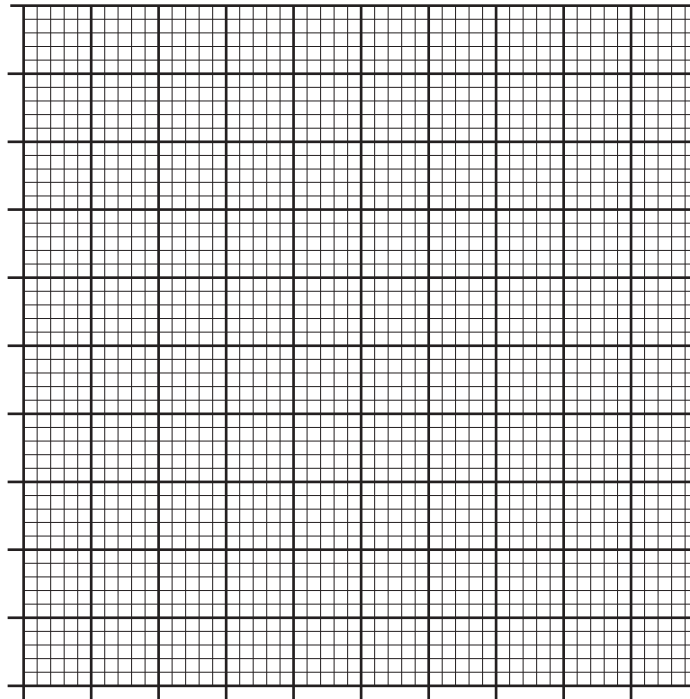
..... kJ

ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 12

Tensile
strength
(MPa)



ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 27



Age of developing baby (months)