King David High School

KDHS

אמת ואמונה

ENTRANCE EXAMINATION

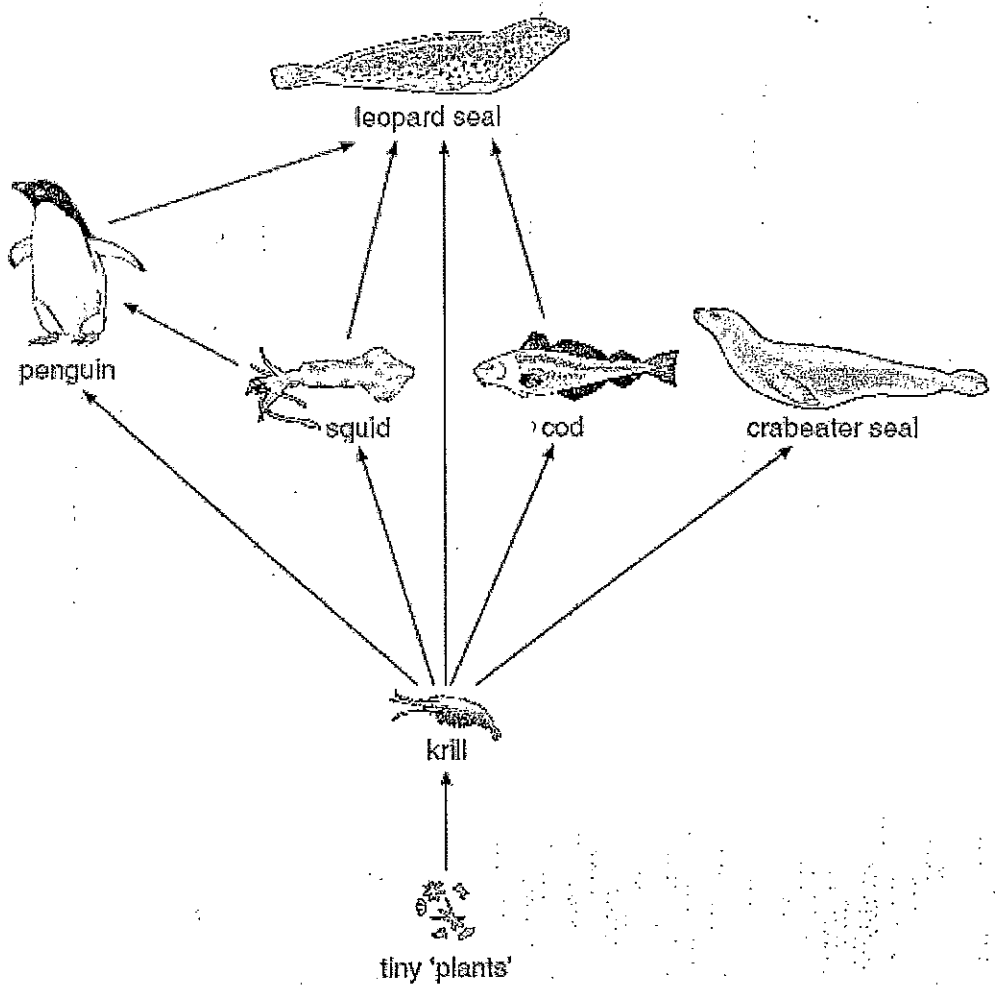
January 2014

Science

Full Name_____

Present School_____

1. The drawing below shows part of a food web in the sea around Antarctica.



not to scale

(a) **From the food web**, give the names of **two** animals that **only** eat krill.

1. .....

1 mark

2. .....

1 mark

(b) (i) Which word describes the plants in a food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

1 mark

(ii) Krill are small animals that eat tiny plants.

Which word describes krill in the food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

1 mark

(c) (i) Crabeater seals eat krill.
Fishermen catch large amounts of krill from the sea.

How would a decrease in the number of krill affect the number of crabeater seals?

.....

.....

1 mark

(ii) Look at the food web.
Leopard seals also eat krill.

A decrease in the number of krill will affect the crabeater seals sooner than it affects leopard seals.
Give the reason for this.

.....

.....

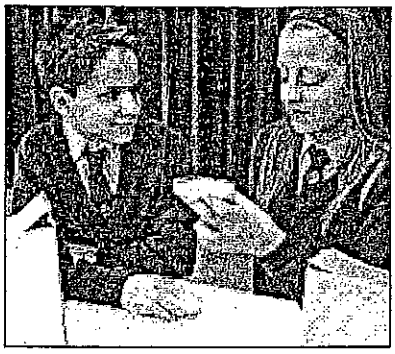
1 mark

(maximum 6 marks)

2. Two pupils were given a sample of 'biological' washing powder and a sample of 'non-biological' washing powder.

They investigated how the two powders compare in removing egg-stains from cloth.

> Our report
>
> 1. We put 'biological' powder into one bowl and 'non-biological' powder into the other bowl. We added water.
>
> 2. We put some egg-stained cloth into each bowl.
>
> 3. We left the bowls for 30 minutes. We dried out the cloth and saw what happened.



Look at their report.

(a) Give **one** way they made their investigation fair.

.....

.....

1 mark

(b) Give **two** ways they could improve their investigation.

1 .....

1 mark

2 .....

1 mark

(c) What should they observe to compare the two types of washing powder?

.....

.....

1 mark

maximum 4 marks

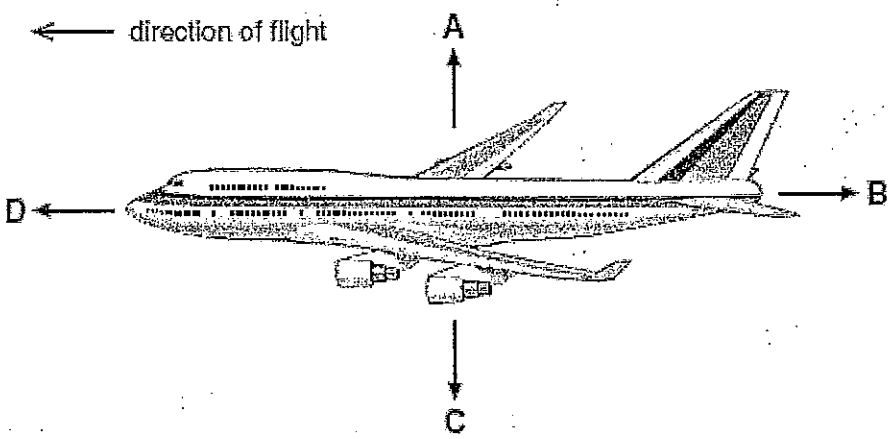
3. Each of the observations shown below has one explanation.

Draw a line from each observation to the correct explanation.

observation	explanation
A ship going out to sea goes out of sight.	The Earth spins on its axis.
We have day and night.	The Earth is a sphere.
We have summer and winter.	The Earth orbits the Sun and the Earth's axis is tilted.
One year on Earth is 365 days.	Gravity attracts objects towards the Earth.
	The Earth orbits the Sun.

maximum 4 marks

4. The diagram shows four forces acting on a plane in flight.



(a) Which arrow represents air resistance?
Give the letter.

.....

1 mark

(b) (i) When the plane is flying at a constant height, which **two** forces must be balanced?
Give the letters.

..... and .....

1 mark

(ii) When the plane is flying at a constant speed in the direction shown, which **two** forces must be balanced?
Give the letters.

..... and .....

1 mark

(c) (i) Just before take-off, the plane is speeding up along the ground.

Which statement is true?
Tick the correct box.

Force B is zero.	☐
Force B is greater than force D.	☐
Force D is equal to force B.	☐
Force D is greater than force B.	☐

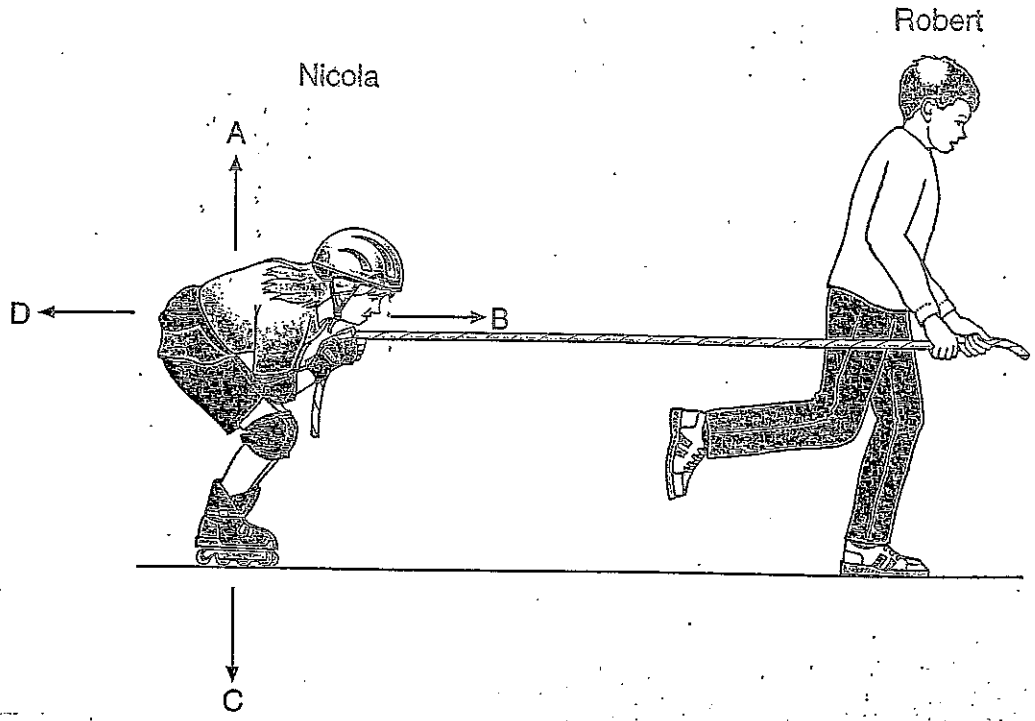
1 mark

(ii) Which statement is true about the plane just as it leaves the ground?
Tick the correct box.

Force C is zero.	☐
Force C is greater than force A.	☐
Force A is equal to force C.	☐
Force A is greater than force C.	☐

1 mark

Nicola is trying out her new roller blades. Robert is pulling her along with a rope.
Arrows A, B, C and D show the directions of four forces acting on Nicola.



(d) (i) Which arrow shows the direction of the force of **gravity** on Nicola?
Give the letter.

_____

1 mark

(ii) Which arrow shows the direction of the force of the **rope** on Nicola?
Give the letter.

_____

1 mark

(iii) Robert pulls Nicola at a steady speed of 2 metres per second.
How far will Nicola travel in 10 seconds?

_____ metres

1 mark

(iv) Nicola lets go of the rope and she slows down. Gravity still acts on Nicola.

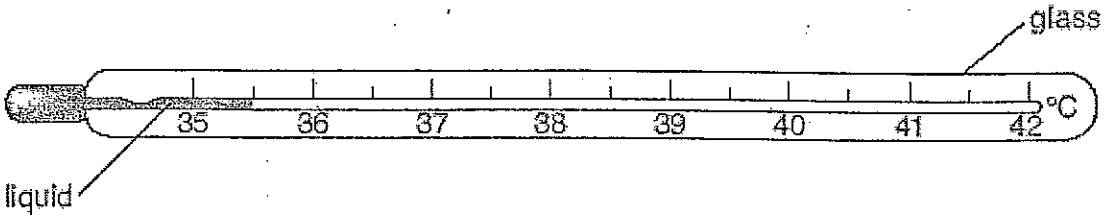
Give the name of **one** other force still acting on Nicola after she lets go of the rope.

1mark

_____

Maximum 9 marks

5. The thermometer drawn below can be used to measure the temperature of the human body.



(a) (i) What is the lowest temperature **this** thermometer can measure?

.....°C

1 mark

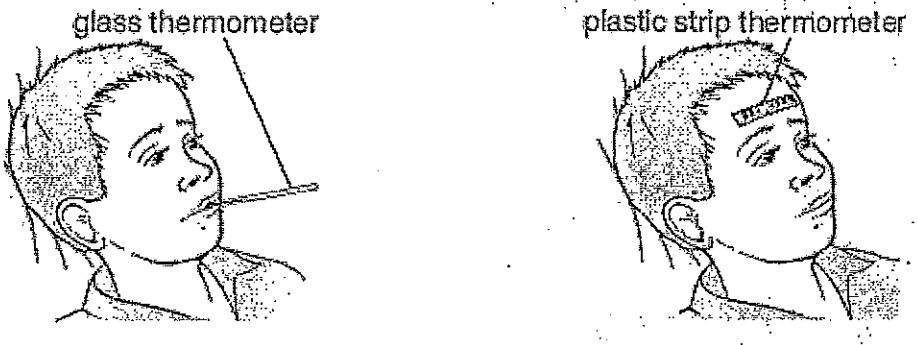
(ii) What is the normal temperature of the human body?
Tick the correct box.

37°C ☐ 39°C ☐ 41°C ☐

1 mark

(iii) When we are ill our temperature may go up.

A nurse can measure a child's temperature with two different thermometers as shown below.



Give **one** reason why it is safer to use a plastic strip thermometer than a glass thermometer.

.....

.....

1 mark

(b) Viruses are micro-organisms that can make us ill.

Give the name of **one** other type of micro-organism that can make us ill.

.....

1 mark

(c) Alcohol and mercury are two liquids that can be used in glass thermometers. The table gives information about these liquids.

liquid	boiling point (°C)	colour
alcohol	78	colourless
mercury	357	shiny grey

(i) A red dye is added to the colourless alcohol used in thermometers. Suggest a reason for this.

.....

.....

1 mark

(ii) Choose words from the list below to fill the gaps in the sentences.

gas **liquid** **solid**

When alcohol and mercury boil they both change from a liquid to a .....

1 mark

A thermometer containing mercury can be used to measure the temperature of an oven at 150°C because mercury is a ..... at 150°C.

1 mark

maximum 7 marks

6. Russell investigated the relationship between mass and weight. He weighed five different masses using a force meter.

His results are shown in the table.

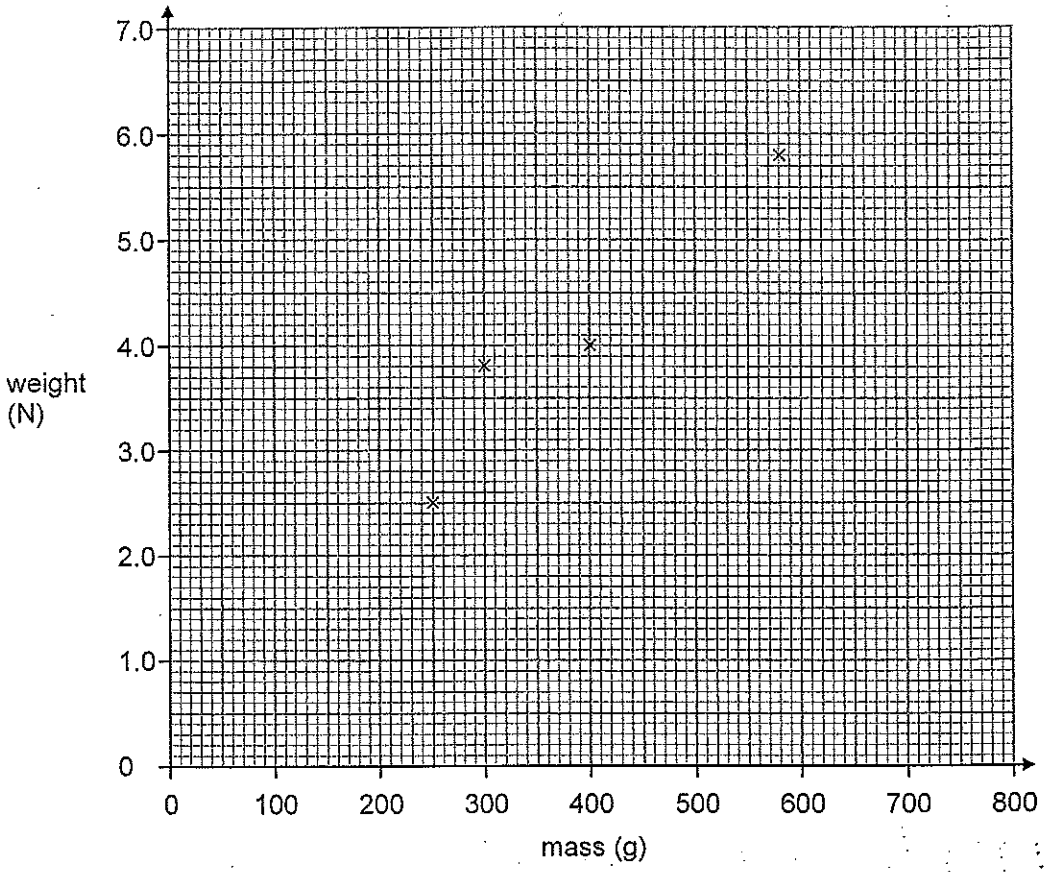
mass (g)	weight (N)
150	1.5
250	2.5
300	3.8
400	4.0
580	5.8

(a) He plotted four of his results on a grid as shown below,

(i) Plot the point for the 150 g mass on the graph.

1 mark

(ii) Draw a line of best fit.



1 mark

(b) One of the points Russell plotted does **not** fit the pattern.

Circle this point on the graph.

1 mark

(c) Use your graph to predict:

(i) the mass of an object weighing 6.5 N;

..... g

1 mark

(ii) the weight of an object of mass 50 g.

..... N

1 mark

(d) Give **one** reason why it is more useful to present the results as a line graph rather than a table.

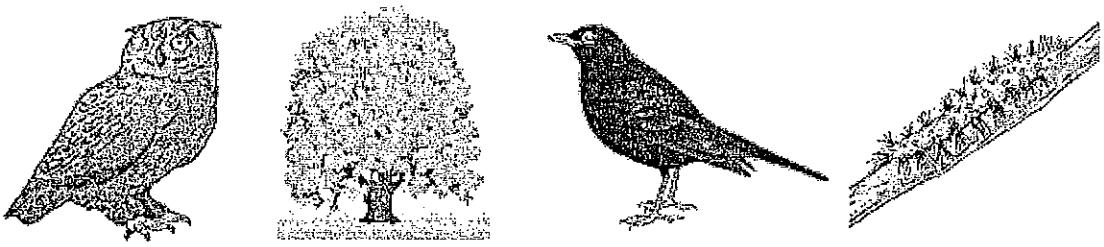
.....

.....

1 mark

maximum 6 marks

7. The drawings below show four living things found in a wood.



owl oak tree blackbird caterpillar

not to scale

- Caterpillars eat oak leaves.
- Owls eat blackbirds.
- Blackbirds eat caterpillars.

(a) (i) Complete the food chain for these four living things.

oak tree → ..... → ..... → .....
.....

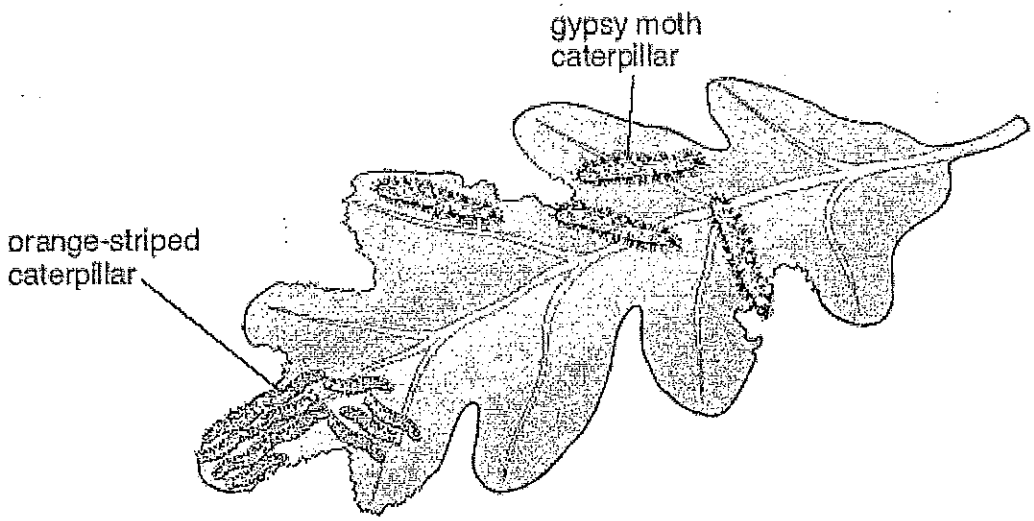
1 mark

(ii) Why is an oak tree called a producer?
Tick the correct box.

It loses its leaves in autumn.	☐	It makes food by photosynthesis.	☐
Its flowers are tiny.	☐	Its leaves will **not** rot.	☐

1 mark

(b) On one oak tree, there were two types of caterpillar.



not to scale

All the caterpillars were eating the leaves.
The number of gypsy moth caterpillars increased.

What happened to the number of orange-striped caterpillars?

.....

1 mark

Explain your answer.

.....

.....

1 mark

(c) There are **no** caterpillars on the oak tree in winter.

Suggest a reason for this.

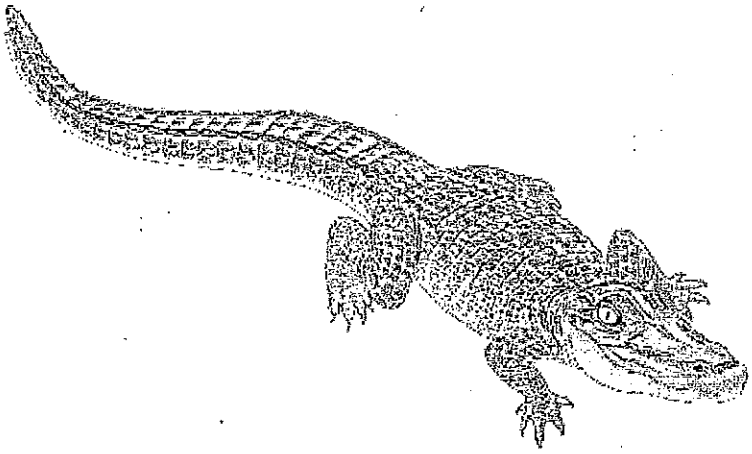
.....

.....

1 mark

maximum 5 marks

8. The drawing below shows an alligator.



(a) Alligators are carnivores.
What does the word carnivore mean?

.....

1 mark

(b) Alligators lay eggs in nests made from plant material.
The eggs have tough shells containing calcium carbonate.

(i) How does the eggshell help the developing alligator to survive before it hatches?

.....

.....

1 mark

(ii) Rotting plant material in the nest is acidic.
When the acid comes into contact with calcium carbonate in the eggshell it makes the shell weaker.

Why does the acid weaken the eggshell?

.....

.....

1 mark

(iii) Suggest **one** reason why it is helpful to the developing alligator in the egg if the eggshell becomes weaker.

.....

.....

1 mark

(c) The table below shows the percentage of female and male alligators that hatch from the eggs when the eggs are kept at different temperatures.

temperature (°C)	% eggs hatching as females	% eggs hatching as males
26	100	0
28	100	0
30	100	0
32	86	14
34	0	100
36	0	100

(i) Use the table to suggest how a zookeeper could make sure only females hatch from the eggs.

.....

.....

1 mark

(ii) Between which **two** temperatures are 50% of the eggs likely to hatch as females?
Tick the correct box.

between 26°C and 30°C ☐

between 30°C and 32°C ☐

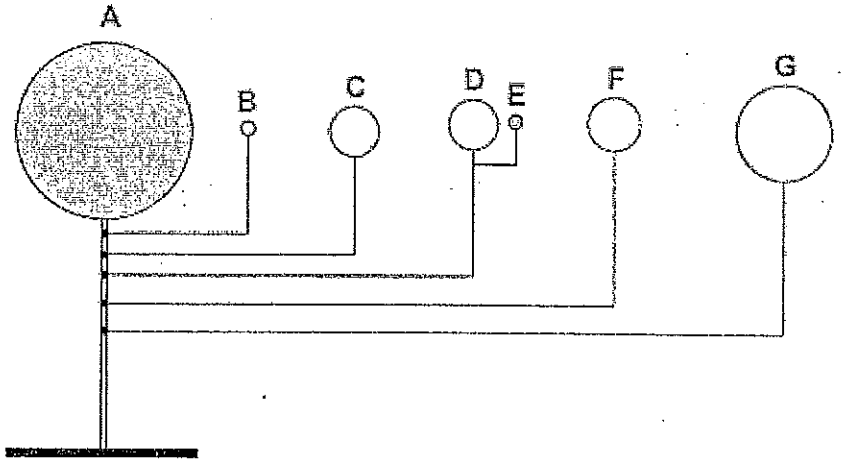
between 32°C and 34°C ☐

between 34°C and 36°C ☐

1 mark

maximum 6 marks

9. (a) Alfie made a model of part of the solar system.
He used metal balls for the Sun, the Moon and the planets.



- E goes around D.
- B, C, D, F and G go around A.

Give the letter that is used to label:

(i) the model Sun;

.....

1 mark

(ii) the model Earth;

.....

1 mark

(iii) the model Moon;

.....

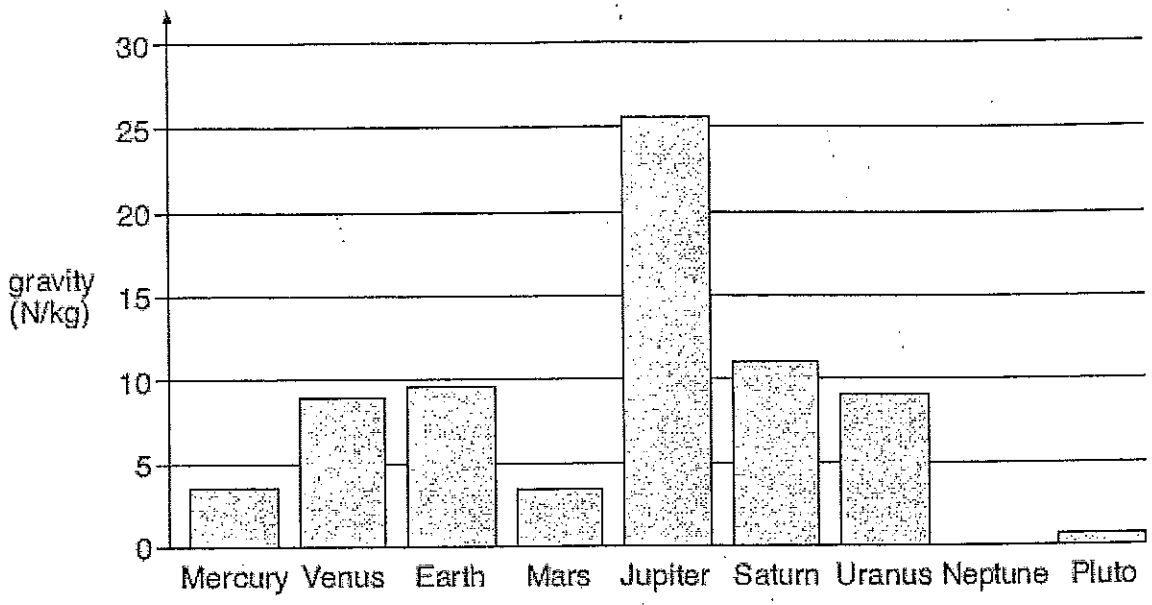
1 mark

(iv) the model planet with the largest orbit.

.....

1 mark

(b) The bar chart shows the force of gravity on eight of the planets.



(i) The gravity on Neptune is 12 N/kg.

On the chart above, draw a bar for the planet Neptune.
Use a ruler.

1 mark

(ii) Give the name of a planet where you would weigh more than you weigh on Earth.

.....

1 mark

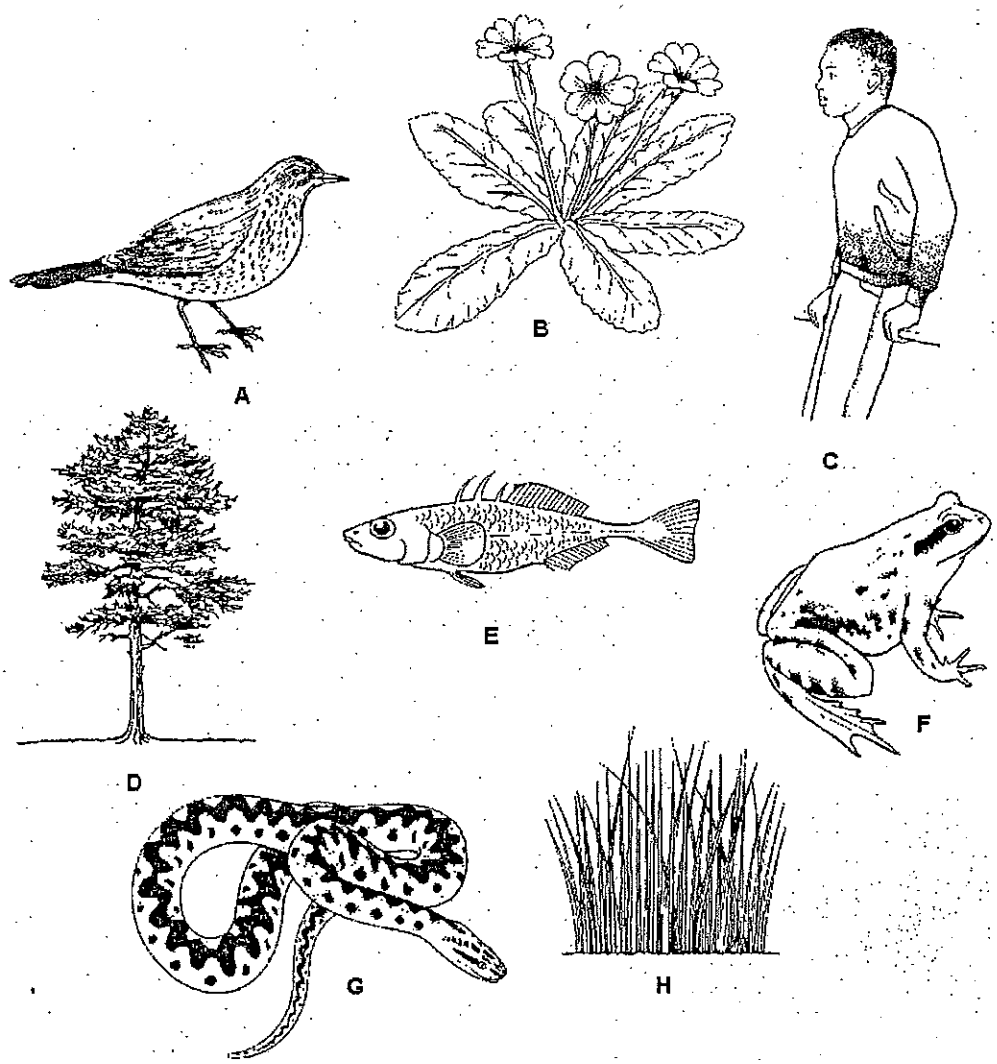
(iii) On which planet would a spaceship need the largest force to take off?

.....

1 mark

maximum 7 marks

10. The drawing shows eight living things.



Eight living things are drawn.

Give the letters of:

(a) **one** living thing which uses gills to take in oxygen;

1 mark

(b) **one** living thing which produces seeds;

1 mark

(c) **one** living thing which uses lungs to breathe;

1 mark

(d) two living things which lay eggs in water;

..... and .....

2 marks

(e) two living things which are covered in scales.

..... and .....

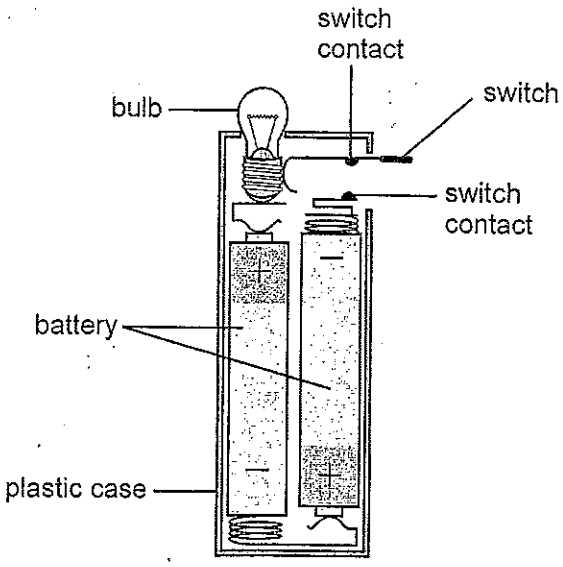
2 marks

f) **Draw a branch key to identify the seven living things**

3 marks

Maximum 10 marks)

11. (a) The drawing below shows the parts of a torch.



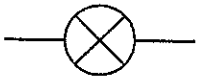
(i) Paul closed the switch.
Why did this turn on the torch?

.....

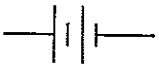
.....

1 mark

(ii) The diagrams below show symbols for a battery, a bulb and a switch.
Connect the symbols to make a series circuit for the torch.



bulb

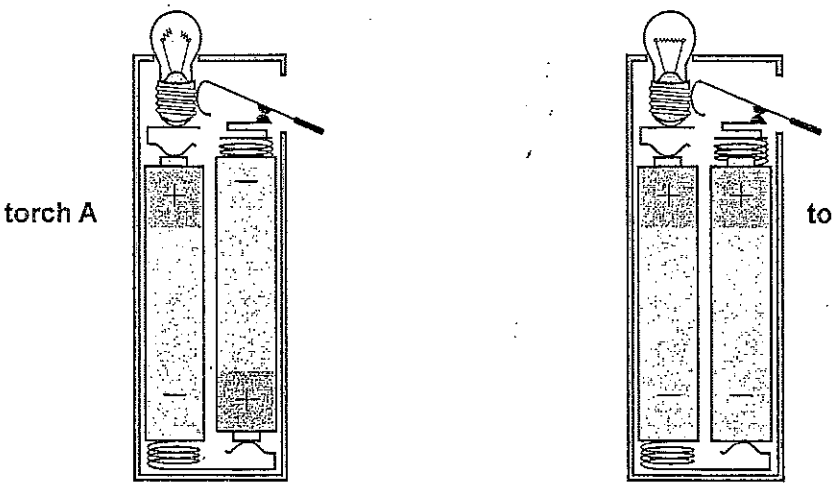


battery

switch

1 mark

(b) The drawings below show two other torches. In both torches, the bulbs will **not** light even when Paul closes the switches.



Look carefully at the drawings.

(i) Why is the circuit of torch A **not** complete?

.....

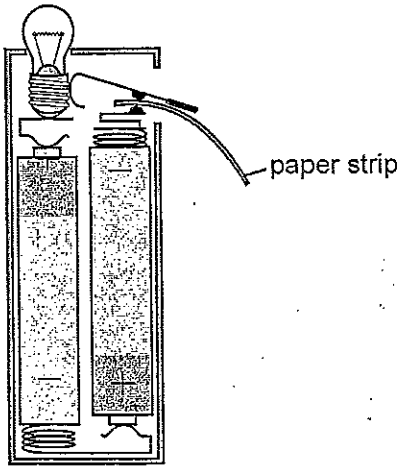
1 mark

(ii) What could you do to torch B to get the bulb to light?

.....

1 mark

(c) When Paul bought his torch there was a paper strip between the contacts of the switch as shown below.



Paul had to remove the paper strip before he could turn the torch on.
Give the reason for this.

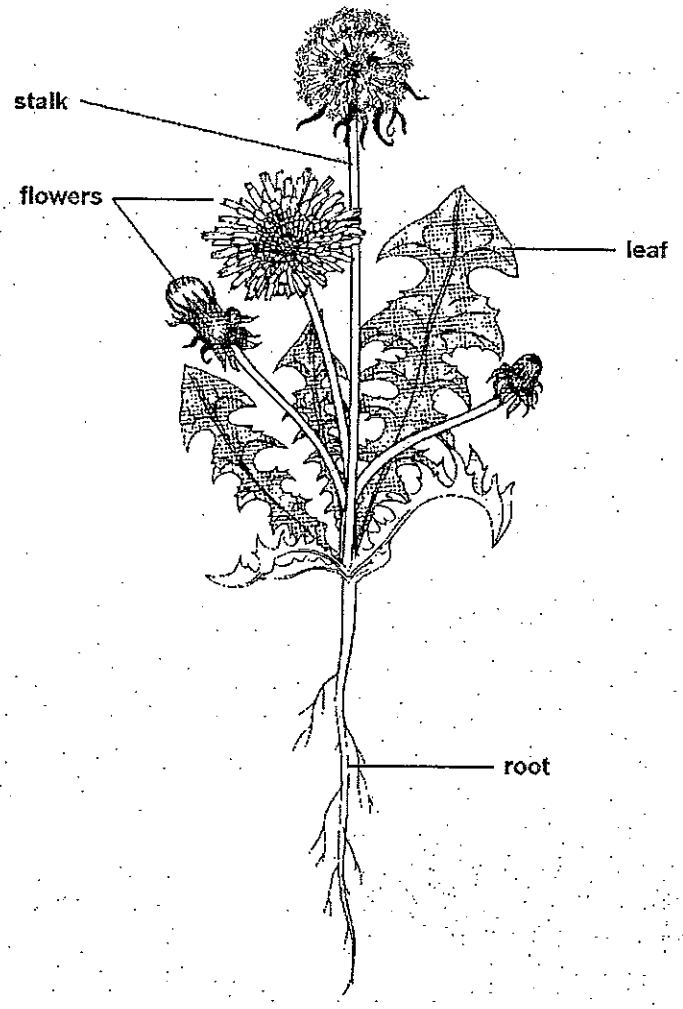
.....

.....

1 mark

maximum 5 marks

12. The drawing below shows a dandelion plant.



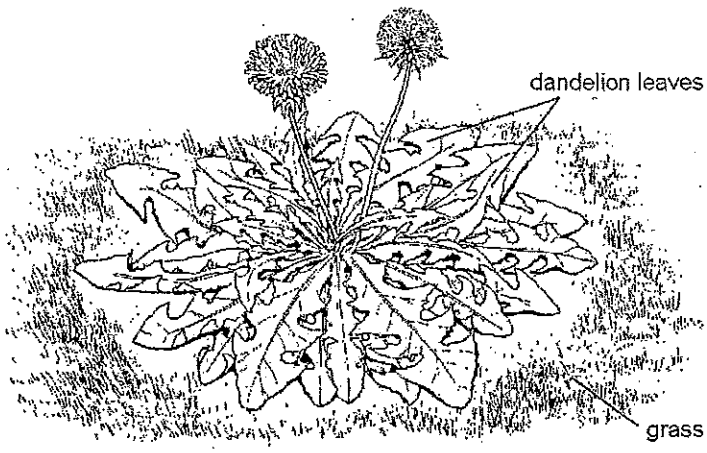
(a) Each labelled part of the plant has a different function.

In the table, write the name of the correct part next to its function.

function of part	name of part
It takes in minerals.	
It absorbs light for photosynthesis.	

2 marks

(b) The drawing below shows a different type of dandelion plant growing in a lawn.



(i) Hardly any grass grows under the dandelion leaves. Give a reason for this.

1 mark

(ii) Which word describes a grass plant?
Tick the correct box.

herbivore ☐

predator ☐

prey ☐

producer ☐

1 mark

Maximum 4 marks

13. (a) Sally measures her pulse rate before swimming ten lengths of a swimming pool. She measures it again afterwards.

What effect will swimming 10 lengths have on her pulse rate?

.....

1 mark

(b) What is the name of the liquid in the circulatory system?

.....

1 mark

(c) The list shows three useful substances and one waste product. They are all in the liquid in the circulatory system.

oxygen **carbon dioxide** **glucose** **vitamins**

Which one of these is a waste product that is produced by the body?

.....

1 mark