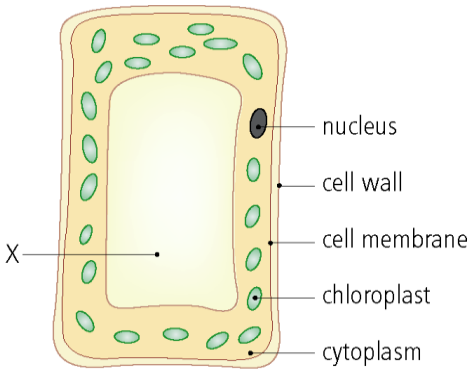
Name:-

1. The diagram shows a plant cell. Some parts of the cell are named.




**a** Which **two named** parts are present in plant cells but not animal cells? -

_____ (*2 marks*)

**b** Which **named** part contains the genetic information? _____ (*1 mark*)

**c** Which **named** part absorbs light energy for photosynthesis? _____

(*1 mark*)

**d** Name the part labelled X on the drawing._____(*1 mark*)

**e** Where in a plant would you find a cell like the one in the diagram, **a**, **b**, **c** or **d**?

**a** In the centre of a root

**b** In the lower surface of a leaf

**c** Near the upper surface of a leaf

**d** Near the surface of a root

**Answer** _____

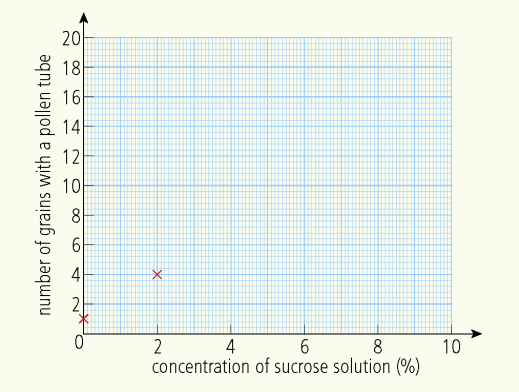
(*1 mark*)

**Maximum = 6 marks**

Name:-

2. Shameena carried out an investigation into the effect of sucrose concentration on the growth of pollen tubes. She put some pollen grains on each of six microscope slides. She then added a drop of sucrose solution each with a different concentration to each slide. After 30 minutes she observed the pollen grains through a microscope. She counted 20 pollen grains on each slide and recorded those that had grown a pollen tube and those that had not. Her results are shown below:

| **Concentration of sucrose (%)** | **Number of grains with a pollen tube** | **Number of grains without a pollen tube** |
|---|---|---|
| 0 | 1 | 19 |
| 2 | 4 | 16 |
| 4 | 9 | 11 |
| 6 | 18 | 2 |
| 8 | 17 | 3 |
| 10 | 10 | 10 |



Name:-

**a** Use graph paper to draw a graph to show the number of pollen grains that grew at each concentration of sucrose solution. Draw a line of best fit on the graph.

(*3 marks*)

**b** Why did Shameena choose to observe 20 pollen grains in each concentration rather than only five? -

_____

_____(*1 mark*)

**c** What percentage of grains produced pollen tubes in 4% sucrose solution?

_____(*1 mark*)

**d** What concentration of sucrose solution was best for the growth of pollen tubes in Shameena's experiment? _____(*1 mark*)

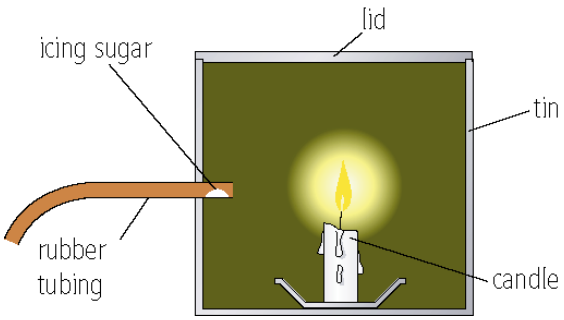
**e** Use your graph to predict how many grains would grow pollen tubes in 7% sucrose solution. _____( 1 mark)

**Maximum = 7 marks**

3. A teacher set up the following apparatus behind a safety screen.

She placed 1 g of icing sugar in the end of the rubber tubing inside the tin, as shown below.

Name:-




The teacher blew through the other end of the rubber tubing.

The icing sugar came into contact with the flame.

There was a loud explosion and the lid was blown off the tin.

**a** Copy and complete the following sentence describing the energy changes which took place.

_____energy in the icing sugar changed to _____ energy and _____energy.

*(3 marks)*

**b** As a result of the explosion, the lid of the tin was pushed off.

Explain what had happened to the gas molecules inside the tin to make this happen. -

_____

_____ *(2 marks)*

**c** When icing sugar is burned in this experiment, the gas **used** and the gas **produced** are the same as when energy is released from sugar in the cells of the body.

**i** Which gas, in the air, is **used** when the icing sugar burns? _____ *(1 mark)*

**ii** Give the name of the gas **produced** when the icing sugar burns. _____

*(1 mark)*

Name:-

**d** The table below shows the energy values of four food substances.

| **Food substance** | **Energy value (kJ per 100 g)** |
|---|---|
| icing sugar | 1680 |
| curry powder | 979 |
| flour | 1450 |
| custard powder | 630 |

The teacher repeated the experiment with 1 g of custard powder.

What difference would this make to the experiment? -

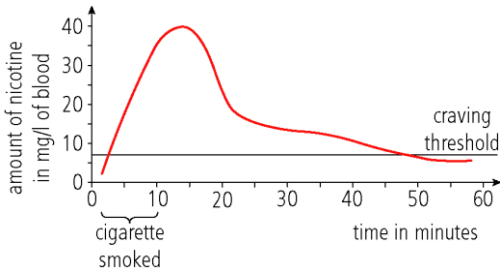
_____

*(1 mark)*

**Maximum = 8 marks**

**4.** Wesley wants to give up smoking but finds it difficult.

**a** The graph shows the level of nicotine in Wesley's blood after he smokes a cigarette. The craving threshold is the amount of nicotine he needs in his blood to stop him wanting a cigarette.




i) Use the graph to calculate how often Wesley needs to smoke a cigarette to keep the nicotine level above the craving threshold.

Name:-

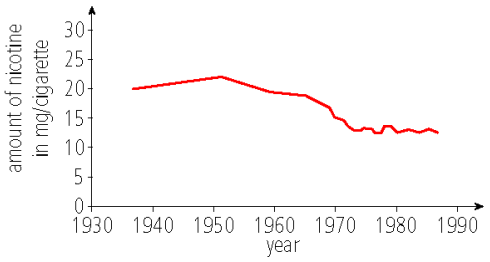
_____ *(1 mark)*

ii) Wesley continues to smoke often. His craving threshold goes up.

Explain why this happens.

_____ *(1 mark)*

**b** The graph below shows how the amount of nicotine in cigarettes changed between 1930 and 1990.




Predict one consequence of reducing the amount of nicotine in cigarettes. Give the reason for your answer.

_____

_____

_____ *(2 marks)*

**c** Cigarette smoke contains carbon monoxide. If a pregnant woman inhales cigarette smoke, some of the red blood cells will combine strongly with carbon monoxide instead of oxygen. If a pregnant woman smokes, how could this harm the fetus?-

_____

*(1 mark)*

**Total = 5 marks**

Name:-

5. The following are important parts of a balanced diet:

**carbohydrates** **proteins** **fats**

**vitamins** **water**

**d** A pupil has a sweet, juicy orange to eat.

Copy and complete the following sentences using words from the list above.

**a** An orange is a good source of

..... and . .....

*(2 marks)*

**b** An orange is a poor source of

..... and . .....

*(2 marks)*

**e** Give the names of **two** parts of a balanced diet which are **not** shown in the list above.

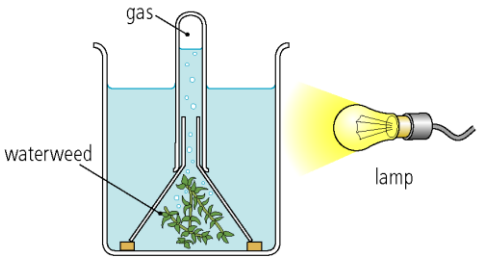
_____

_____

*(2 marks)*

**Total = 6 marks**

6. The rate of photosynthesis can be measured as the volume of oxygen released by a plant per minute. The number of bubbles released per minute from a waterweed is counted.



Name:-

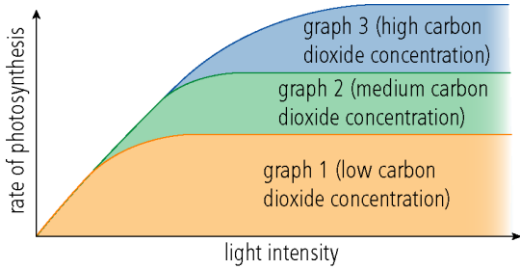
a) The gas collected in this experiment is **not** pure oxygen.

Suggest a reason for this.

_____

*(1 mark)*

The graphs below show the effect of light intensity on the rate of photosynthesis at different carbon dioxide concentrations.




b) Explain what the graphs show.

_____

_____

_____

*(2 marks)*

c) Many years ago, gardeners used to keep a large tub of fresh manure in their greenhouses. The manure was not added to the soil in which the plants were growing, but the plants grew more quickly in the greenhouses containing a tub of manure.

Suggest how the activity of the bacteria in the manure led to an increase in the rate of photosynthesis in these plants.

_____

_____

_____*(2 marks)*

**Total = 5 marks**

Name:-

7. **a** Which letters below represent definitions of a chemical element?

**A** A substance that contains a single compound.

**B** A substance that can only be made up of single atoms that are not chemically bonded to each other.

**C** A substance that contains only one type of atom.

**D** A substance that cannot be broken down chemically into simpler substances.

Answer _____and _____ (*2 marks)*

**b** Approximately how many elements exist on Earth?

**A** About 10

**B** About 100 Answer _____*(1 mark)*

**C** About 1000

**D** Well over 1 000 000

**c** Name the elements represented by the following symbols

**i** C **ii** H **iii** O **iv** N **v** S

i)_____

ii)_____

iii) _____

iv)_____

v)_____

*(5 marks)*

What is the symbol for chlorine?_____ *(1 mark)*

**Maximum = 9 marks**

Name:-

**8.** Washing soda contains sodium carbonate.


**a** Which gas is given off when sodium carbonate reacts with dilute hydrochloric acid?

_____*(1 mark)*

**b** Describe a positive test for the gas in **a**.

_____

_____

_____ (*2 marks*)

**c** Draw a labelled diagram of the apparatus you could use to conduct the test in **b**.

(*3 marks*)

Name:-

**d** Write down the general equation for a carbonate reacting with an acid._____

_____

_____ (*3 marks*)

**Total = 9 marks**

**10.** Copy and complete this table:

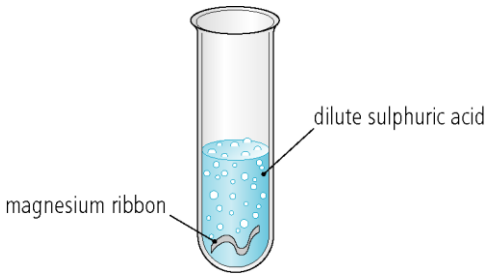
| **Name** | **Symbol or formula** | **Element(s) present** |
|---|---|---|
| Oxygen | $O_2$ | **a** _____ |
| **b** Lead _____ | PbS | **c**_____**:** _____ |
| Copper sulphate | $CuSO_4$ | **d** copper,_____;_ _____ |
| Sodium chloride | **e** Na _____ | **f**_____**;** _____ |
| **g** Calcium _____ | $CaCO_3$ | **h** _____**;** _____**;**_____ _____ |

*(8 marks)*

**Maximum = 8 marks**

Name:-

**11.** A student added a piece of magnesium ribbon to dilute sulphuric acid.




a) List three ways she could tell that a chemical reaction was taking place._____

_____

_____ *(3 marks)*

b) Write down the **general** equation that describes the reaction between a metal and an acid.

_____

_____ *(2 marks)*

c) Write the **word** equation for the reaction between magnesium and dilute sulphuric acid.

_____

_____*(1 mark)*

d) Give the **balanced symbol** equation for the reaction between magnesium and dilute sulphuric acid.

_____

_____ *(3 marks)*

**Total = 9 marks**

Name:-

**12.** The diagram shows two explorers on a snowy mountain.

**a** Where do both explorers get their energy from? (*1 mark*)

**b** State two ways in which the resting explorer is using energy.

_____(*1 mark*)

**c** How does his thick coat reduce the amount of energy he uses?

_____(*1 mark*)

**d** State one extra way in which the climber is using energy.

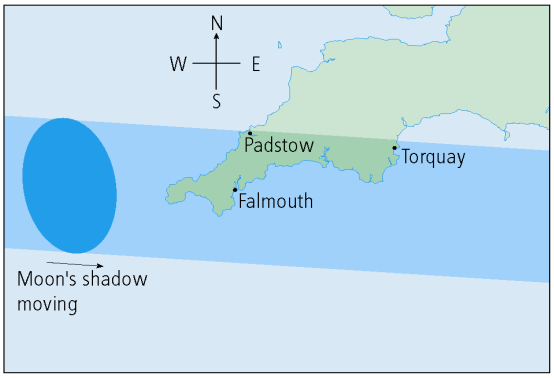
_____(*1 mark*)

**e** Who would use up most energy just to climb the mountain, a man or a woman? Suggest a reason why.

_____(*1 mark*)

**Total = 5 marks**

**13.** Look at the diagram showing the path of the Moon's shadow across part of the Earth's



surface during the solar eclipse of August 1999.

**a** Draw a diagram to show the relative positions of Sun, Earth and Moon during a solar eclipse.

(*1 mark*)

**b** Why did Falmouth experience darkness for longer than Torquay?

_____(*1 mark*)

**c** For people watching the solar eclipse, the Moon appeared to be the same size as the Sun and to cover the Sun exactly. What would the observers have seen if the Sun had been larger?

_____(*1 mark*)

**d** What factor, other than the relative sizes of Sun and Moon, causes the Moon to cover the Sun exactly during a solar eclipse?

_____

(*1 mark*)

**Total = 4 marks**

Name:-

14. This question is about the path light takes through a prism.

a) When white light passes through a prism it is dispersed. Explain what is meant by 'dispersion'.

_____

_____ *(1 mark)*

b) Draw a diagram to show the path of a ray of white light through a prism. Label the colours of light that are refracted most and least.

*(2 marks)*

c) Particles of dust and moisture in the atmosphere act like small prisms to refract light from the Sun. Use your knowledge of refraction to explain why the sky looks blue in daytime and why the Sun looks red at sunrise and sunset.

_____

_____

_____ *(2 marks)*

**Maximum = 5 marks**

Name:-

**15.** There are three main types of musical instrument: string, wind and percussion.

a) For each type of instrument, state what vibrates to make the sound produced by the instrument.

String_____

Wind_____

Percussion_____*(3 marks)*

*b)* For string instruments, state one factor that can be changed to change the sound produced, and explain the effect that the factor has on the sound produced.

_____

_____ *(2 marks)*

c) For wind instruments, state one factor that can be changed to change the sound produced, and explain the effect that the factor has on the sound produced.

_____

_____*(2 marks)*

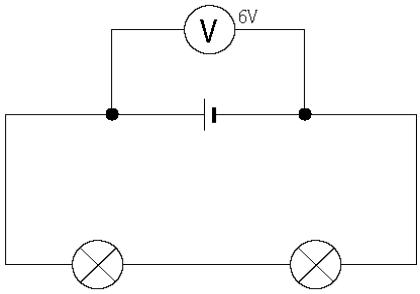
d) For percussion instruments, state one factor that can be changed to change the sound produced, and explain the effect that the factor has on the sound produced.

_____

_____*(2 marks)*

**Maximum = 9 marks**

Name:-




16. The circuit diagram shows a cell being used to light two identical lamps.

a) What would the voltmeter read if it were placed across one of the bulbs? Use energy changes to explain why.

_____

_____

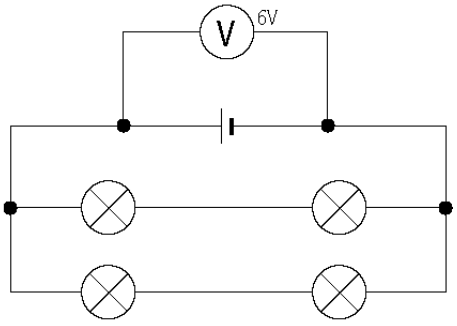
_____ *(2 marks)*

b) What would happen to the brightness of the bulbs if the cell were replaced by a cell with a higher voltage? Explain why.

_____

_____*(1 mark)*

c) The diagram shows two more bulbs connected across the cell, in parallel with the first two. What will happen to the brightness of the bulbs?




_____

*(1 mark)*

Name:-

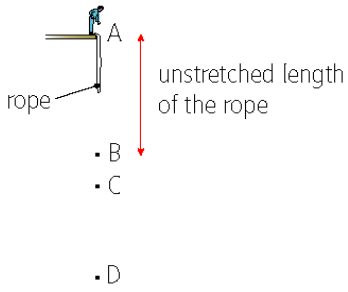
d) What effect will adding the two extra bulbs have on the cell? Why?

_____

_____*(1 mark)*

**Total = 5 marks**

17. A man does a 'bungee jump' over a lake. He jumps from point A with an elasticated rope tied to his ankles. The rope reaches down to a point B when it is not being stretched.
The man falls past B, and the rope begins to stretch. He falls past point C to point D, which is the lowest point he reaches. Then he begins to move upwards again. Eventually he comes to rest at point C.




**a) i** At which point, A, B, C or D, is the man when the tension in the rope is greater than his weight?

_____

_____

*(1 mark)*

Name:-

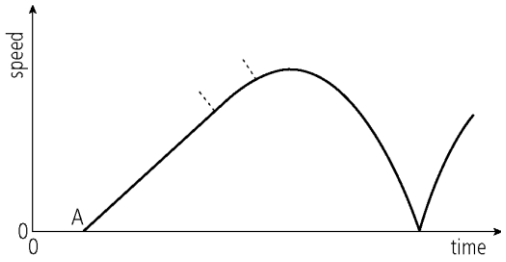
**ii** At which point, A, B, C or D, is the man when the tension in the rope is equal to his weight?

_____

_____

*(1 mark)*

The graph shows how the man's speed varies with time as he falls from point A to point D and bounces back upwards.




b) The point when the man jumped from A has been labelled on the curve. Copy the graph. Label the points on the curve when the man was at points B, C and D as he fell.

*(3 marks)*

Name:-

c) The total energy of the man and the rope includes the man's potential energy, his kinetic energy, and the elastic (strain) energy stored in the stretched rope.

Describe how the elastic (strain) energy in the rope changes as the man falls from point A to point D.

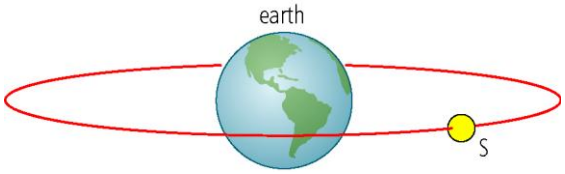
_____

_____

_____ *(2 marks)*

**Total = 7 marks**

**18.** The diagram shows a satellite in orbit around the Earth:




a) State **two** ways in which the force of gravity on a satellite orbiting the Earth can be increased.

_____

_____

_____ *(2 marks)*

b) The satellite in the diagram is in Geostationary orbit. Explain what 'Geostationary orbit' means.

Name:-

_____

_____*(1 mark)*

c) What would happen to the satellite if it slowed down? Explain why.

_____

_____

*(1 mark)*

d) What would happen to the satellite if it speeded up? Explain why.

_____

_____*(1 mark)*

e) A second satellite is put into polar orbit so that it can survey the surface of the Earth several times each day.

Explain what is meant by 'polar orbit'.

_____

_____

*(1 mark)*

Will the satellite in polar orbit be closer to Earth or further from Earth than satellite S? Explain your answer.

_____

_____

_____

_____ *(2 marks)*

**Total = 8 marks**

# END OF EXAMINATION PAPER

Name:-

**ENSURE YOUR NAME IS WRITTEN ON THE FRONT SHEET OF EACH SECTION**

**AND THAT EACH SECTION IS SECURED WITH A SECURITY TAG.**