

Name:



OUNDLE

School

2016 Non Common Entrance Examination
For Third and Fourth Form Entry

Science

Time Allowed : 60 minutes

- *Please write your name in the box above*
- *Answer as many questions as you can in the time available*
- *The paper is out of 60 marks; 20 for Biology, 20 for Chemistry, and 20 for Physics*

You will need:

- *A pen*
- *A pencil*
- *A ruler*
- *A calculator*

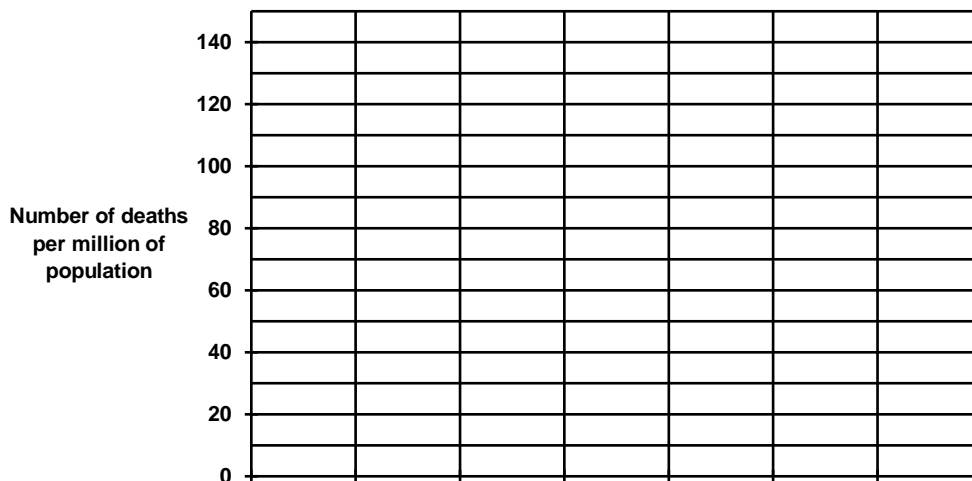
Biology mark /20	
Chemistry mark / 20	
Physics /20	
Total mark /60	
Percentage	

Biology Section

1. The table shows the number of deaths from lung cancer in 6 different countries.

Country	Number of deaths from lung cancer (per million of the population)
USA	130
England	90
Italy	75
Holland	60
Portugal	45
Spain	80

a. On the grid, draw a bar chart of these figures.



(3)

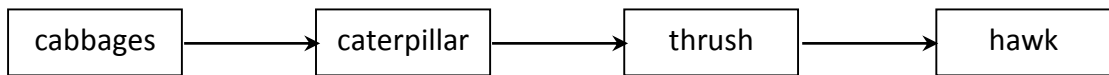
b. In which country would you expect cigarette smoking to be the highest.

.....

(1)

[Total 4 marks]

2. Below is a common food chain.



a. The cabbage plants are described as the producer in the food chain. What does this mean?

.....
.....
.....

(2)

b. What is the name of the life process that involves an organism supplying itself with food?

.....

(1)

c. Name **one** animal from the food chain which is:

i. a predator.

.....

(1)

ii. a prey animal.

.....

(1)

d. What does the arrow between the cabbages and the caterpillars represent?

.....

(1)

e. When the organisms in the food chain die they will decay.

i. Name **two** types of organisms which bring about decay.

.....
.....

(2)

ii. Gardeners make use of this process of decay in a compost heap. Name two conditions, in a compost heap, which help to speed up the process of decay.

Circle your answers from the list below.

dry light warmth lack of carbon dioxide cold dark damp

(2)

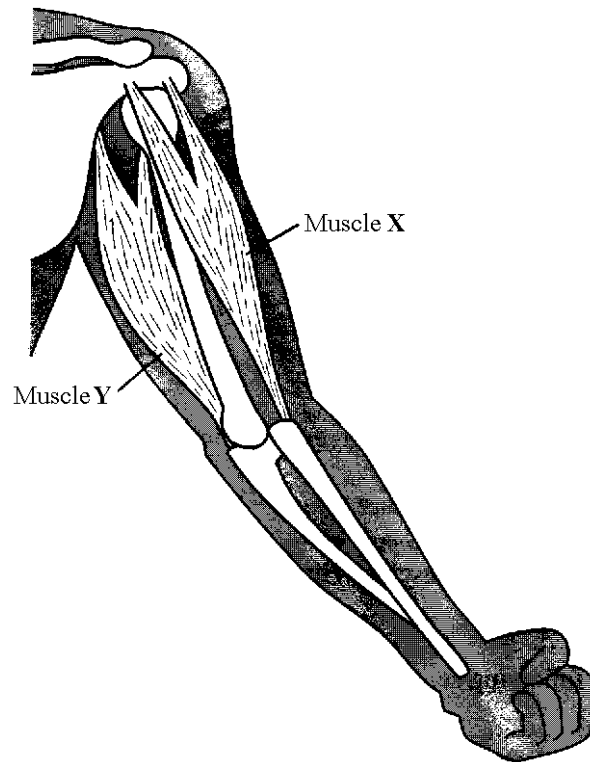
f. Elephants eat a diet that includes hard to break down branches from trees, in order to deal with this woody material they have very large teeth designed to grind food into a pulp. Which kind of teeth do they have?

.....

(1)

[Total 11 marks]

3. The drawing shows the bones and some of the muscles in a human arm.



a. Describe what will happen to the arm when the muscle labelled **X** contracts.

.....

(1)

b. Muscle **Y** reverses the effect produced by muscle **X**. Why is a second muscle needed?

.....

(1)

- c. Choose words from the box to complete the sentences. You may use each word once or not at all.

elastic	hard	inelastic	rigid	tough
---------	------	-----------	-------	-------

Ligaments hold joints together. To do this, and allow some movement, they must be and

Tendons attach muscles to bones. When muscles pull, the tendons transmit the pull to the bones. To do this, the tendons must be

(3)

[Total 5 marks]

Total marks for Biology Section = 20 marks

Chemistry Section

1. This Question is about elements and compounds.
a. Sulfur and Magnesium are two different elements with different characteristics. Fill in the table below.

Question	Sulfur	Magnesium
Is it a metal or non-metal?		
Is it an electrical conductor or insulator?		
Is its oxide acidic or basic?		

(3)

- b. Water is a compound. State the definition of a compound.

.....
.....
.....

(2)

- c. What is the chemical formula of water?

.....

(1)

- d. What is the name of a process which you can use to obtain pure water from sea water?

.....

(1)

- e. How can you determine if a sample of water is pure?

.....
.....
.....

(1)

- f. Water is one product of the reaction between NaOH and HCl. What type of reaction is this?

.....

(1)

[Total 9 marks]

2. Calcium carbonate, CaCO_3 , is commonly known as limestone.

a. What happens to calcium carbonate when it is heated?

.....
(1)

b. Calcium carbonate will react with acids, give the name of an acid that calcium carbonate will react with.

.....
(1)

c. What is the pH of a strong acid?

.....
(1)

d. If an acid and calcium carbonate are mixed carbon dioxide is given off. How could you prove the gas given off is carbon dioxide?

.....
.....
.....
(2)

e. Carbon dioxide undergoes sublimation at -78°C . What state would carbon dioxide be in at the following temperatures?

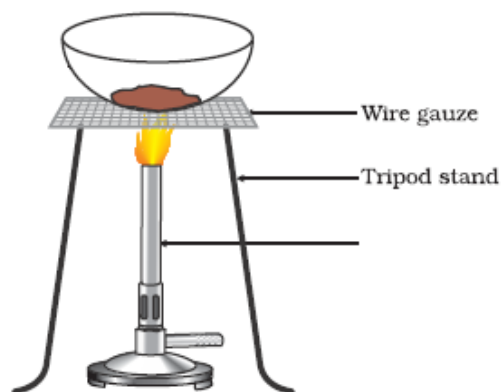
At -100°C carbon dioxide would be a

At -65°C carbon dioxide would be a

(2)

[Total 7 marks]

3. The diagram shows the reaction of zinc oxide and magnesium. The products of this reaction are zinc and magnesium oxide



- a. What is the name of the piece of apparatus that is used to heat the reaction?

.....
(1)

- b. What type of reaction is the occurring in this experiment?

.....
(1)

- c. Which metal, zinc or magnesium, is higher in the reactivity series?

.....
(1)

- d. Complete the following statement with either the word 'faster' OR 'slower'

The reaction between zinc with a dilute acid will be when compared to the reaction between magnesium and the same dilute acid.

(1)

[Total 4 marks]

Total marks for Chemistry Section = 20 marks

Physics Section

1. A student uses this apparatus to investigate forces stretching a spring.



She uses a ruler to measure the vertical distance h between the bottom of the mass hanger and the base of the stand.



- a. Suggest two ways that the student can measure distance h more accurately.

1.
.....
2.
.....

- b. The Student continues her investigation by loading the spring with different masses. The table shows her results.

Mass in g	Force in N	Distance h in cm
20	0.2	4.6
40	0.4	3.9
60	0.6	3.1
80	0.8	2.3
100	1.0	1.6
120	1.2	0.9

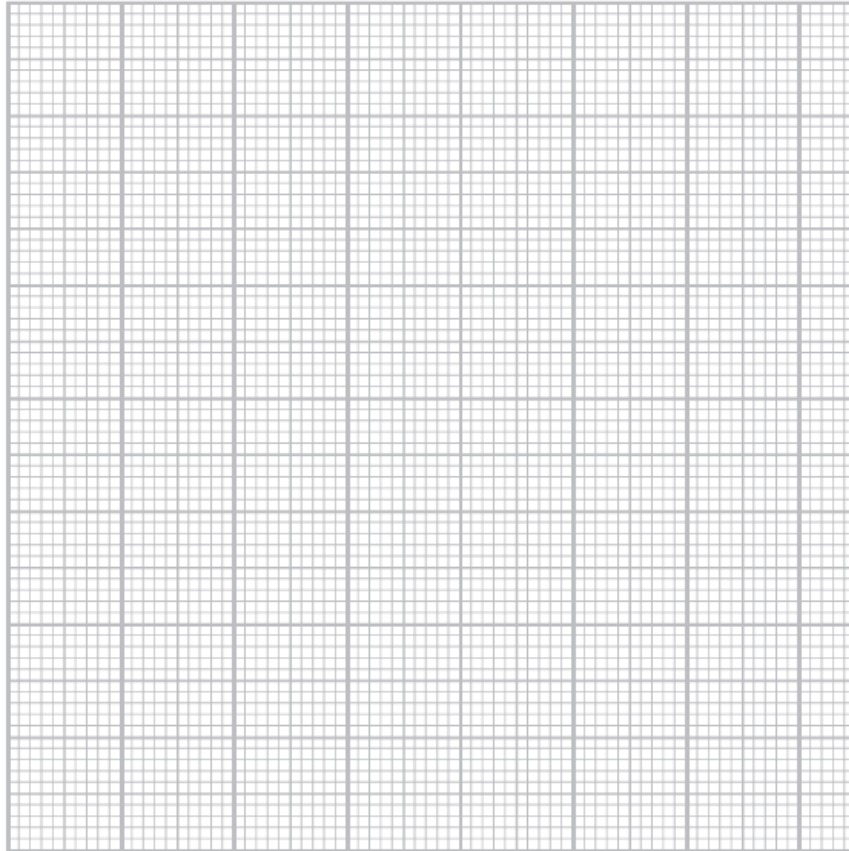
- i. Name the dependent variable in this investigation.

.....
(2)

- ii. Explain how the force values in the table are calculated.

.....
.....
.....
.....
(2)

- iii. Plot a graph of distance h against force, and draw a line of best fit.



(5)

- iv. Use your graph to find the force for which h is zero.

Force = N

(1)

[Total 12 marks]

2. The diagram shows part of an electric circuit.

Complete the circuit diagram by adding:

- A resistor in series with the lamp and battery,
- A second lamp in parallel with the first lamp,
- A voltmeter that measures the voltage across the resistor,
- An ammeter that measures the current in the resistor.



[Total 4 marks]

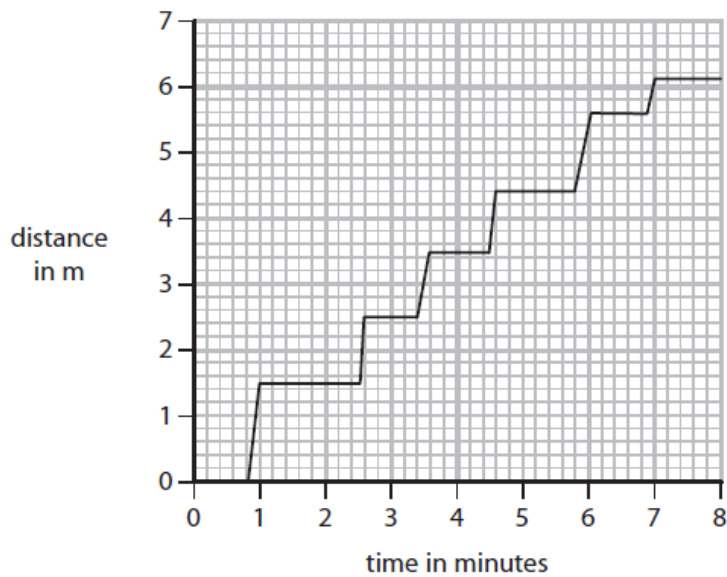
3. The diagram shows some people waiting in a queue at a supermarket.



The queue moves forward each time a person leaves the checkout.

Person C spends seven minutes in the queue before reaching the checkout.

The graph shows how the distance changes with time for person X.



a. What is the initial length of the queue?

Initial length = m

(1)

- b. Explain how you could use the graph to work out the number of times person X is stationary.

.....

.....

.....

.....

(2)

- c. State the equation linking average speed, distance, and time taken.

(1)

[Total 4 marks]

Total marks for Physics Section = 20 marks