Surname	Centre Number	Candidate Number
Other Names		0

GCSE – NEW

3430U10-1

S18-3430U10-1

SCIENCE (Double Award)

Unit 1: BIOLOGY 1
FOUNDATION TIER

MONDAY, 11 JUNE 2018 – MORNING

1 hour 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**6**	
3.	**8**	
4.	**9**	
5.	**8**	
6.	**7**	
7.	**6**	
8.	**9**	
Total	**60**	

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ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen. Do not use correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Question **6***(a)* is a quality of extended response (QER) question where your writing skills will be assessed.

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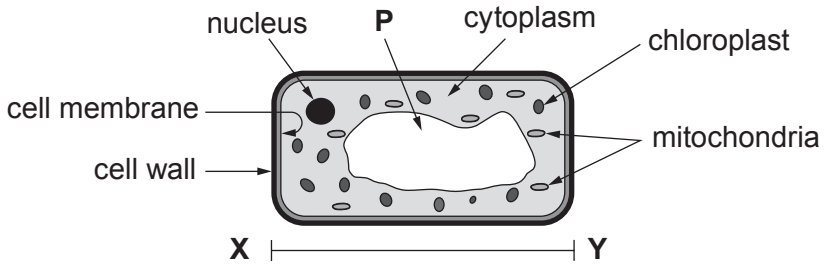
Answer **all** *questions.*

1. The diagram shows a plant cell. Some structures have been labelled.



(a) (i) Use a ruler to measure the length of the cell at **X – Y** in mm. [1]

length at **X – Y** = ... mm

(ii) The diagram is magnified ×400.

Use your answer to part (i) to calculate the actual length of the cell. [1]

actual length = ... mm

(b) State the name of structure **P**. [1]

.....

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(c) Complete the following table about plant cells. [4]

Name of structure	Function
.....	respiration
.....	controls entry and exit of materials
chloroplasts	.....
.....	contains chromosomes

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Turn over.

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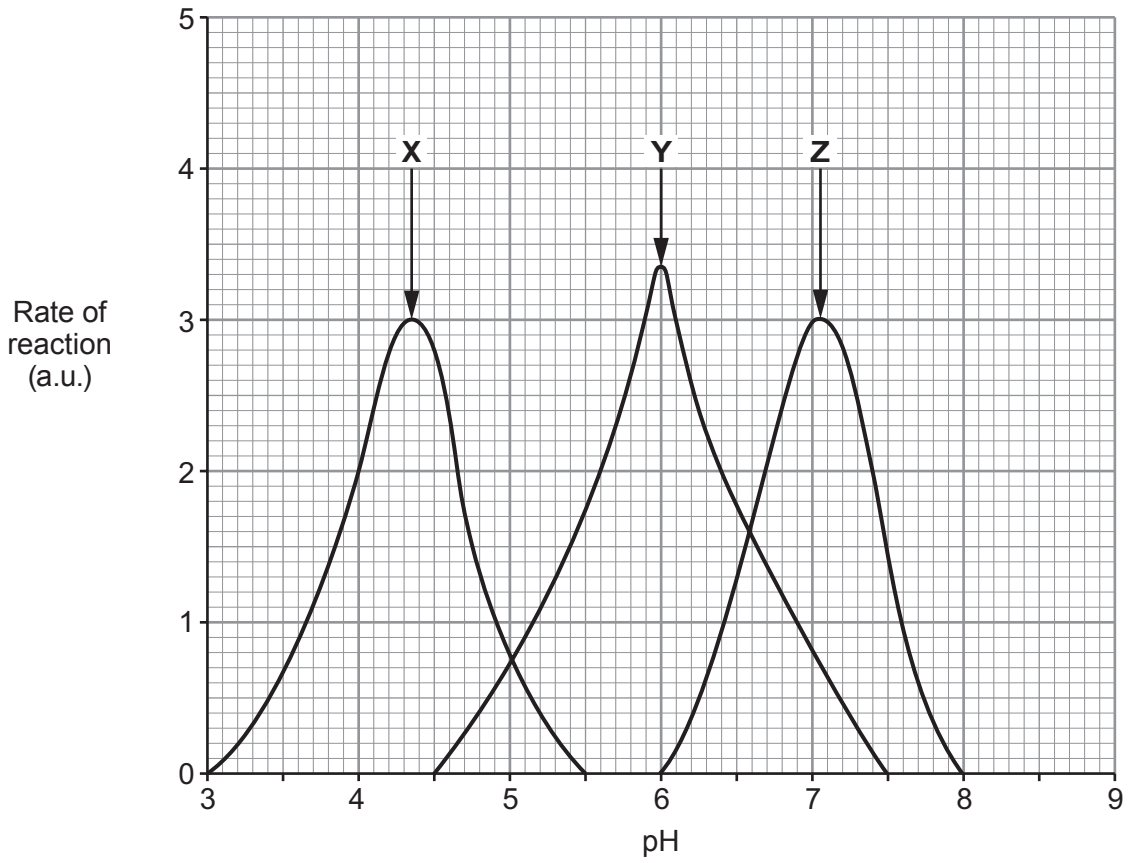
2. *(a)* Complete the following sentences about enzymes using some of the words from the list below. [3]

digestion **photosynthesis** **diffusion** **respiration** **osmosis**

Some enzymes break down large molecules into small molecules, for example during ..... and ..... .

Other enzymes build up large molecules from small molecules, for example during ..... .

(b) The graph shows the activity of three enzymes, **X**, **Y** and **Z** at different pH values.



(i) State the enzyme (**X**, **Y** or **Z**) that is active only in acid conditions. [1]

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(ii) Underline the pH range at which **both** enzymes **Y** and **Z** work. [1]

Between pH 4.5 and pH 8.0

Between pH 4.5 and pH 7.5

Between pH 6.0 and pH 7.5

(iii) Enzyme **Z** is found in saliva.

State a structure in the body that produces saliva. [1]

.....

6

Turn over.

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3. The photograph shows an insect called an aphid *(Aphis)*.

Aphids damage crops such as barley, by making holes in the leaves. They then suck out sugar solution through the holes. A thick layer of fungi can then grow on the damaged leaves, so they absorb less light energy.

Farmers may use pesticides on their crops. Pesticides are effective, but may also be toxic to harmless organisms. Another approach is to release insects such as ladybirds onto the crop. Ladybirds are secondary consumers that are common in many food chains. They target pests such as aphids and so reduce their numbers.

(a) Using **only** the information above, give the evidence that:

(i) barley is photosynthetic; [1]

.....

(ii) aphids are primary consumers; [1]

.....

(iii) ladybirds are carnivores; [1]

.....

(iv) using ladybirds is less likely to damage the environment than using pesticides. [2]

.....

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(b) (i) A farmer growing barley aims to harvest 8.0 tonnes/hectare.
Aphids reduce her harvest by 15 %.

Calculate the loss due to the aphids in tonnes/hectare. [2]

loss = ... tonnes/hectare

(ii) The farmer is paid £117.00 per tonne for her barley.

Use your answer to (i) to calculate how much money the farmer loses per hectare due to aphid damage. [1]

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loss = £..... per hectare

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4. An investigation compared the composition of inspired and expired air. This is shown in the table below.

Gas	% Concentration of air	
	inspired	expired
oxygen	20.9	16.0
carbon dioxide	0.04	4.0
water vapour	variable	variable
nitrogen	78.1	78.1

(a) (i) Calculate the difference in the % concentration of oxygen in the expired air and the inspired air. [1]

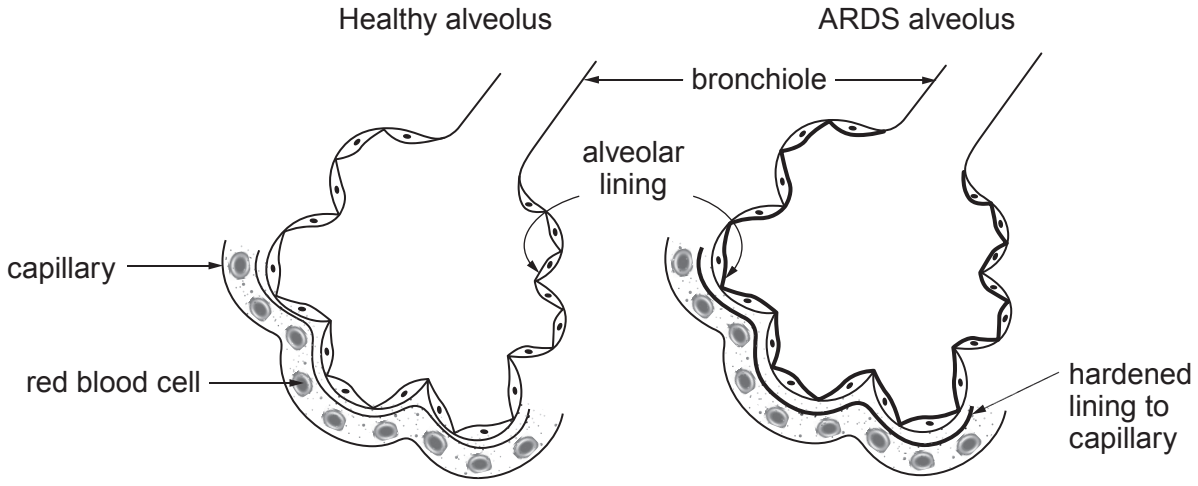
difference = ... %

(ii) State the process in cells that uses oxygen and glucose to release energy. [1]

.....

(b) People with a disease called ARDS (Acute Respiratory Distress Syndrome) have difficulty getting enough oxygen.

The diagrams show a healthy alveolus and an alveolus from someone with ARDS.



(i) **Draw an arrow on the diagram** of the **healthy** alveolus, to show the direction of movement of oxygen through the alveolar lining. [1]

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(ii) Describe **two** differences you can see between the two diagrams and explain why people with ARDS have difficulty getting enough oxygen from inspired air. [3]

.....

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.....

(c) Many different types of molecules pass across cell membranes.

Complete the table below to show the direction of movement of molecules between blood and muscles. Place **one** tick (✓) in each row. [3]

Molecule	**From** blood **to** muscles	**From** muscles **to** blood	**To and from** blood and muscles
oxygen			
carbon dioxide			
water			

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5. *(a)* Give **one** harmful effect that may result from each of the following lifestyle choices. [2]

(i) eating excess salt (sodium chloride)

.....

(ii) smoking cigarettes

.....

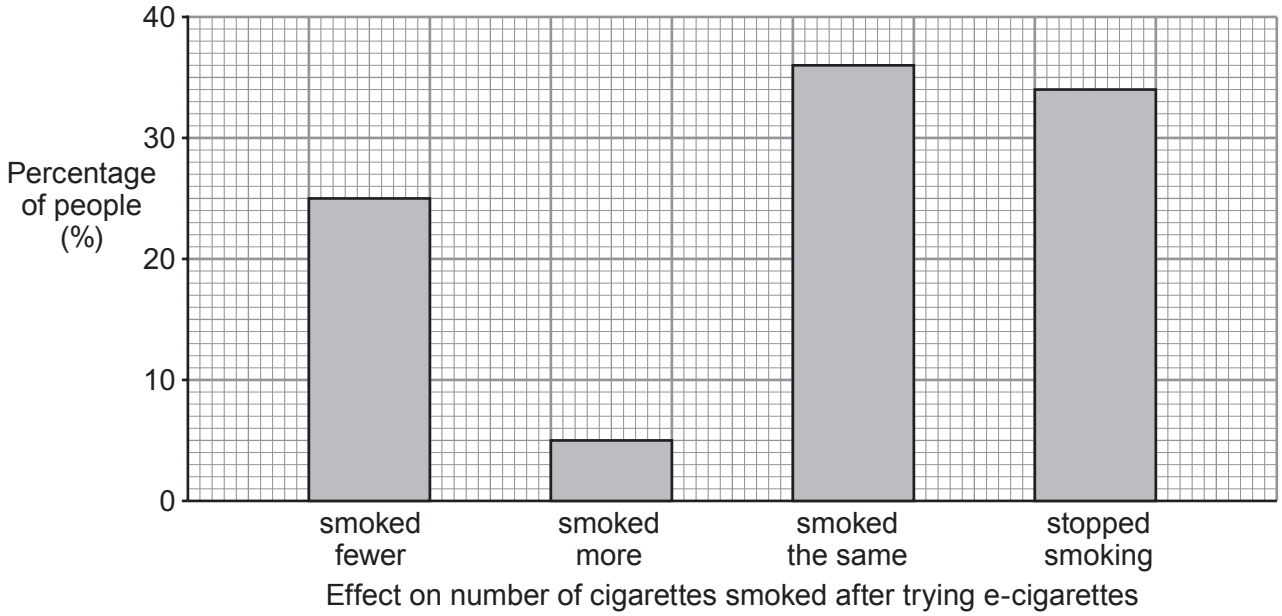
(b) Many people who smoke cigarettes would like to stop.

One method aimed at helping people stop smoking is by using an e-cigarette as shown in the photograph.

In 2016, 838 young people living in Wales were asked about using an e-cigarette.

Some of those questioned were cigarette smokers who had tried using e-cigarettes to help them cut down or stop smoking tobacco. *[ASH survey 2016]*

The bar chart shows how trying e-cigarettes affected their cigarette smoking.



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(i) How successful was using e-cigarettes in helping young people cut down or stop smoking? Use **all** the results in the bar chart to justify your answer. [4]

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(ii) The original sample involved 838 young people. A second survey is planned to include 10 000 people. Suggest **two** factors which should be considered in the selection of the people to take part in the second survey, to make it more representative of the population of Wales. [2]

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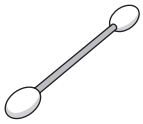
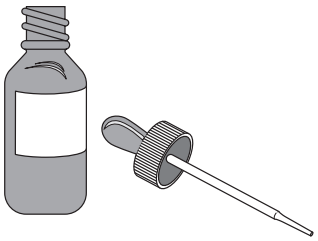
6. *(a)* Describe the method you would use to make a slide of your own cheek cells using the apparatus below. [6 QER]

glass slide

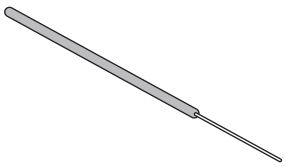
cover slip



cotton wool bud



methylene blue stain



mounted needle

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(b) Make a large drawing of one cheek cell in the box below.

Include the cell structures you would see when viewed at the highest magnification of a light microscope. No labels are required. [1]

7

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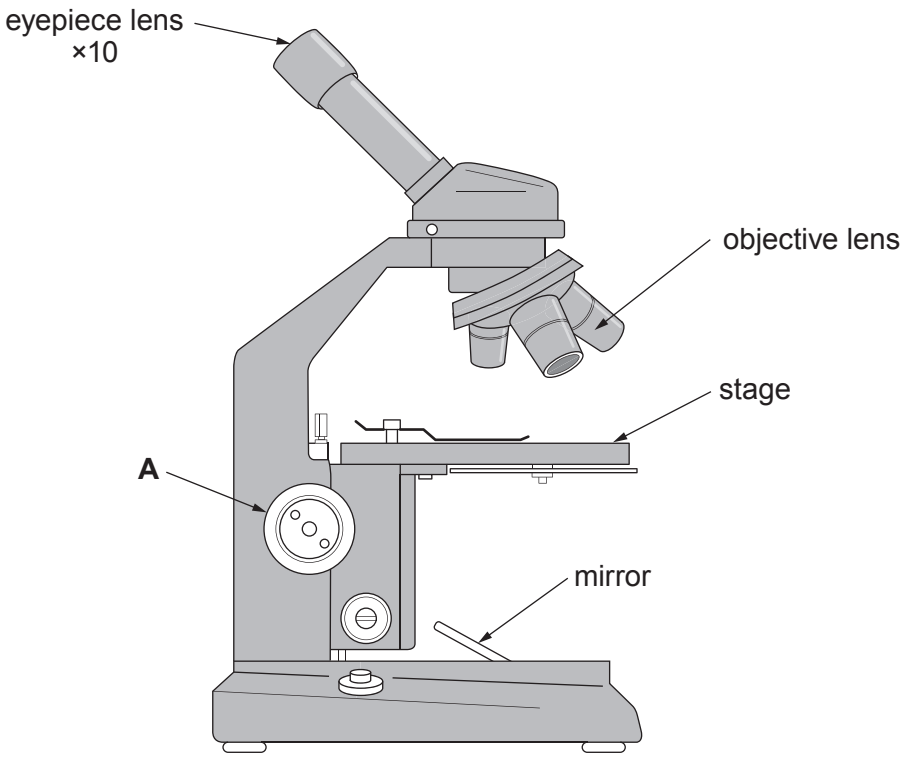
7. Rhys was asked by his teacher to set up a light microscope so that he could view some cells at a magnification of ×100. The microscope had three objective lenses of ×4, ×10 and ×40 magnifications. Rhys was also given a prepared slide of muscle cells.



(a) Explain how Rhys could view the muscle cells at a magnification of ×100. [2]

.....

.....

.....

(b) State the function of structure **A** on the diagram. [1]

.....

Examiner only

(c) When Rhys viewed the muscle cell under the microscope he could see that the cells were not found on their own, but were grouped together in large numbers.

(i) Muscle cells are described as being specialised cells. State the advantage to the organism of having specialised cells. [1]

.....

.....

(ii) State the name given to a large number of the same cells grouped together. [1]

.....

(d) In biology, what is meant by the term organ? [1]

.....

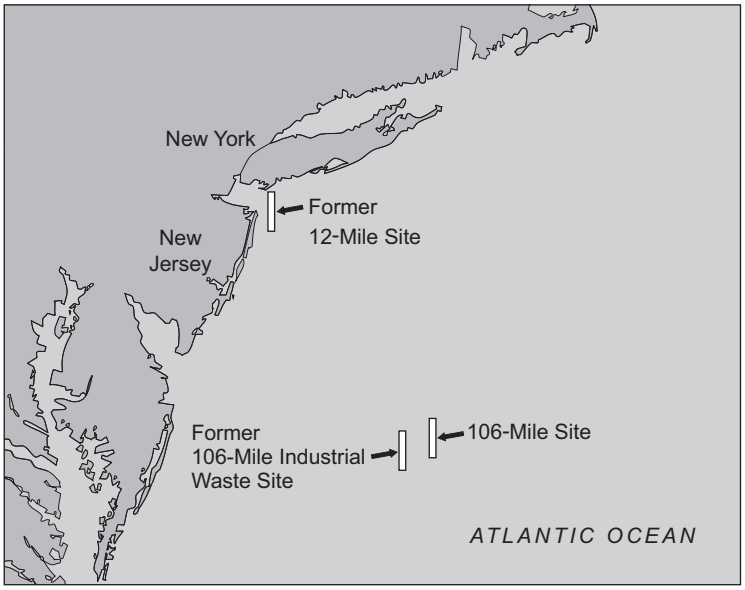
.....

6

8. In the past, many countries, including the UK, have disposed of sewage sludge in the open ocean. A famous example of this practice is the '106 mile' dump site in the North West Atlantic. This site, 106 miles off the east coast of the USA, served the populations of New York and New Jersey. Prior to the use of the '106 mile' dump site sewage sludge was disposed of at the '12 mile' dump site.

(All data from the US Environmental Protection Agency Report to Congress Sept 1995)

Map **1** showing the east coast of the USA together with disposal sites



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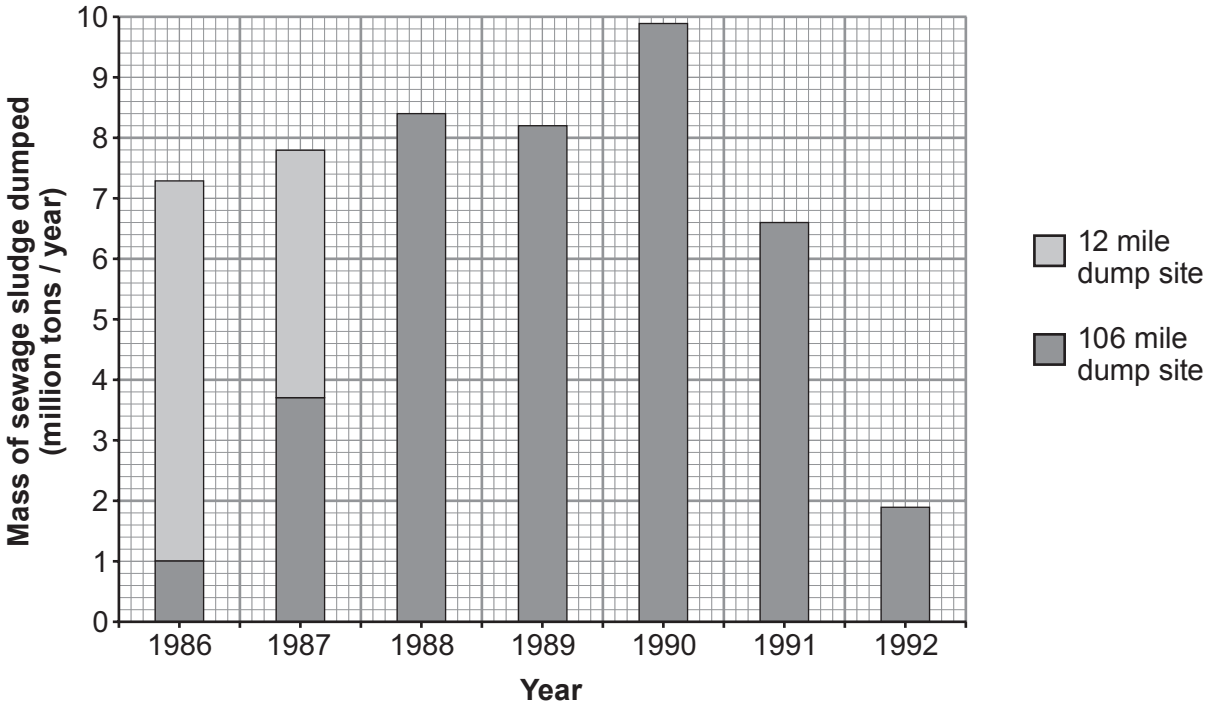
Graph showing the annual disposal of sewage sludge at the '12 mile' and '106 mile' dump sites from 1986 to 1992.



(a) (i) Calculate the total mass of sewage sludge disposed of at the '12 mile' dump site in 1986 and 1987. [2]

total mass of sewage sludge = ... million tons

(ii) What was the final year in which sewage sludge was disposed of at the '12 mile' dump site? [1]

.....

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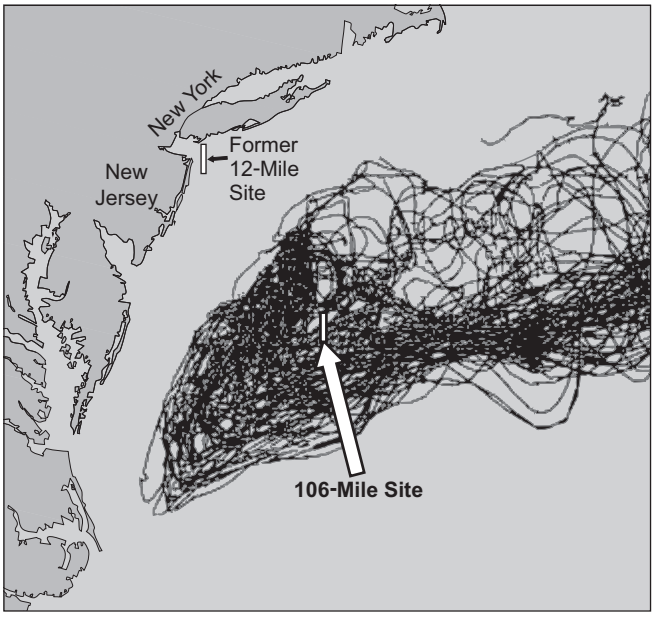
(iii) The US Environmental Protection Agency released buoys into the ocean at the 106 mile dump site. They used satellites to track the movement of the buoys between 1989 and 1992.

drifting buoy tracked by satellite

Map **2** showing the movement of buoys



Use the information in map **2** to suggest why it was decided to select a sewage dump site 106 miles off the east coast of the USA and to close the '12 mile' dump site. [2]

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(b) Of the sewage sludge which is dumped, 20 – 70% reaches the sea bed. Here the oxygen consumed by living organisms increases greatly. Explain why this happens. [3]

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(c) Close to the '106 mile' sewage dump site is the former '106 mile' **industrial** waste dump site. (See map **1** on page 16). Name **one** group of industrial wastes which you would expect to find at this site. [1]

.....

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END OF PAPER

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