OCR
Oxford Cambridge and RSA

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Wednesday 13 June 2018 – Morning

GCSE ENVIRONMENTAL AND LAND-BASED SCIENCE

B682/02 Plant Cultivation and Small Animal Care (Higher Tier)

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Pencil
- Ruler (cm/mm)
- Calculator

Duration: 1 hour

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES

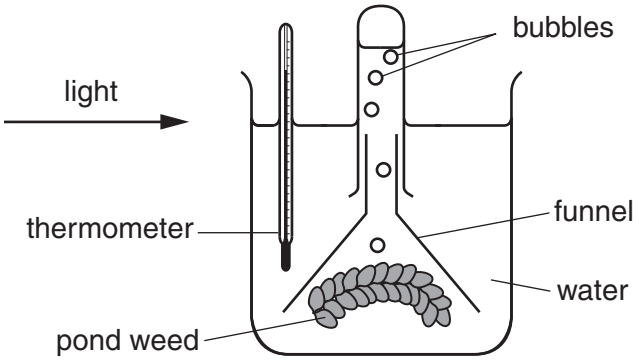
- Your quality of written communication is assessed in questions marked with a pencil (✎).
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **50**.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

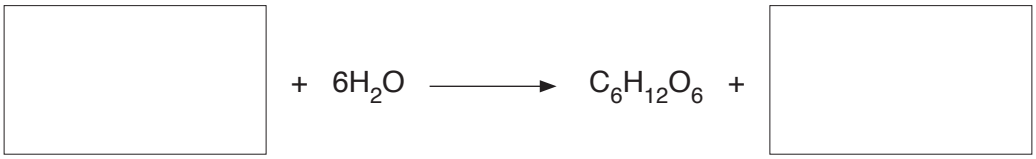
1 **(a)** Jacob carried out an experiment to see how temperature affected the rate of photosynthesis.

He set up an experiment as shown in the diagram below.

He carried out the experiment four times. Each time he used water at different temperatures. He counted how many bubbles the pond weed gave off in one minute at each temperature.



Complete the balanced symbol equation for photosynthesis.



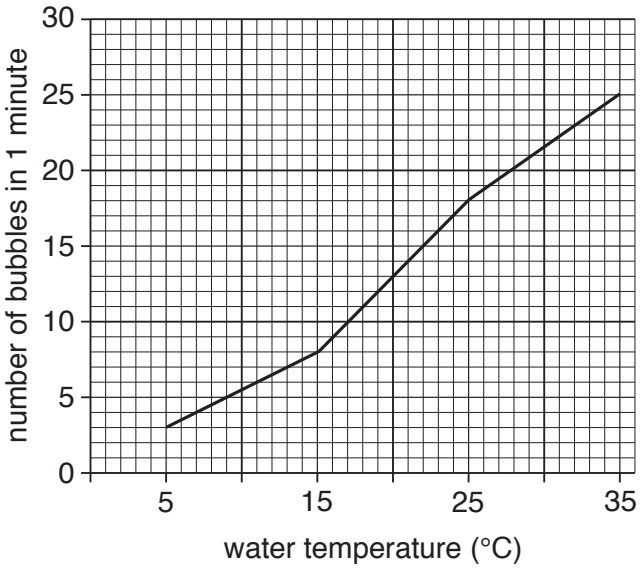
[1]

(b) Jacob's results are shown in the table below.

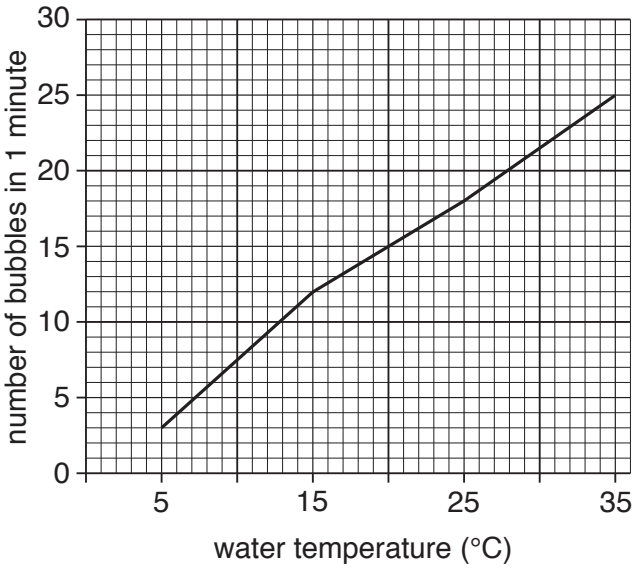
Water temperature (°C)	5	15	25	35
Number of bubbles in 1 minute	3	8	18	25

Which of the following graphs, **A**, **B**, **C** or **D**, represents Jacob's results?

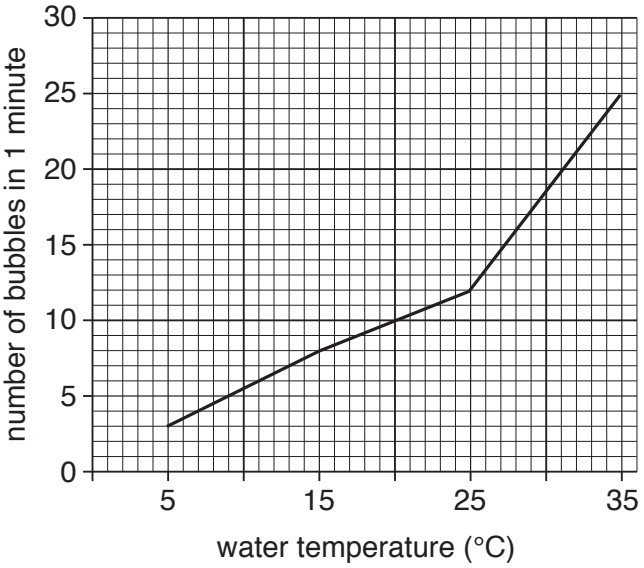
A



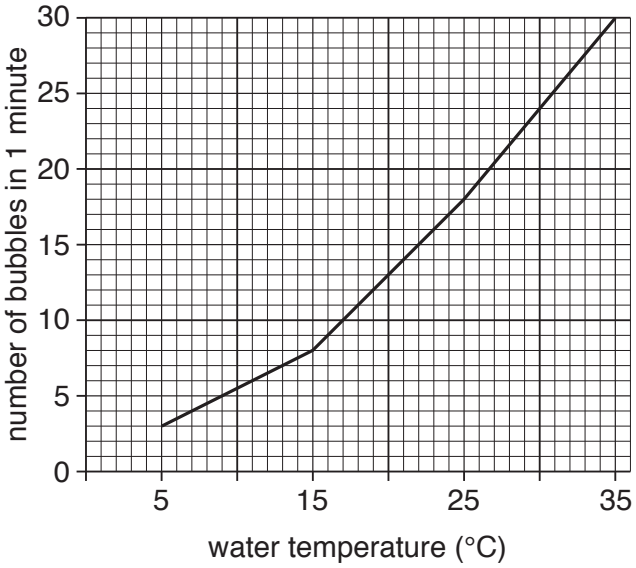
B



C



D



Answer **A**, **B**, **C** or **D**: ..... **[1]**

(c) Describe and explain the trends shown in Jacob's results.

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..... **[2]**

(d) The results suggest that the rate of photosynthesis is highest at 35°C.

Apart from cost, explain why most growers do not heat their glasshouses to 35°C.

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..... **[2]**

2 **(a)** A scientist investigated the chemicals in pea seeds when they germinate.

She analysed the seeds in one group **before** they started to germinate.

She germinated the seeds in the other group **then** analysed the seedlings.

Chemical	Percentage (%) of dry mass	
	Seeds before germination	Seedlings after germination
Protein	25	25
Lipids (Fats)	50	20
Sugars	5	15
Cellulose	5	10
Other substances	15	20

Calculate the percentage increase in sugars during germination.

..... % **[1]**

(b) Describe and explain the roles of water, oxygen and temperature in the germination of pea seeds.

The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

3 **(a)** The table shows the nutrient values of some common fertilisers.

Type of fertiliser	Nitrogen (N) %	Phosphorus (P) %	Potassium (K) %
Cow manure	0.6	0.4	0.5
Wood ash	0.0	1.0	7.0
Dried blood	12.0	1.5	0.0
Bonemeal	2.0	15.0	0.0
Chicken manure	1.1	0.8	0.5

To increase the amount of nitrogen in a field, dried blood is applied at the rate of 2.5 tonnes per hectare.

What tonnage of cow manure would need to be applied per hectare to achieve the same result?

Show your working.

..... tonnes of cow manure per hectare **[2]**

(b) A gardener wants to grow tomato plants.

Which **two** fertilisers from the table, would you recommend are used?

Give reasons for your answer.

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..... **[2]**

(c) Growmore is an inorganic fertiliser that contains the following nutrient values.

	Nitrogen (N) %	**Phosphorus (P) %**	**Potassium (K) %**
Growmore	7	7	7

A gardener prefers to add organic fertilisers to the soil rather than use Growmore.

Apart from the cost, suggest **two** reasons for this.

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..... **[2]**

4 A lack of vitamin C in the diet causes many guinea pigs to die.

Genetic modification of the crops used to produce the food for guinea pigs could help prevent this.

Explain the process and the possible issues of using genetic engineering to produce crops with a high vitamin C content which could be used for guinea pig food.

The quality of written communication will be assessed in your answer to this question.

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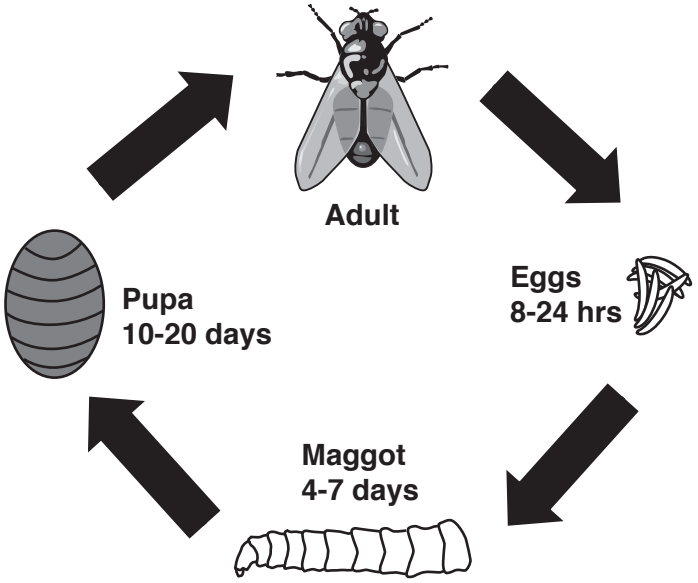
5 **(a)** The diagram shows the life cycle of a blowfly.



(i) Blowflies can lay their eggs in the fur of a rabbit's hindquarters.

What type of organism is a blowfly maggot?

Put a tick (✓) in the box next to the correct answer.

bacterium ☐

external parasite ☐

fungus ☐

internal parasite ☐

[1]

(ii) A blowfly lays its eggs on a rabbit.

What is the maximum time, in **hours**, that the maggots could still be feeding on the rabbit?

..... hours **[1]**

(b) A blowfly maggot infestation can seriously affect a rabbit's health and cause death.

Explain how vaccinations work and why vaccinations cannot prevent maggot infestation.

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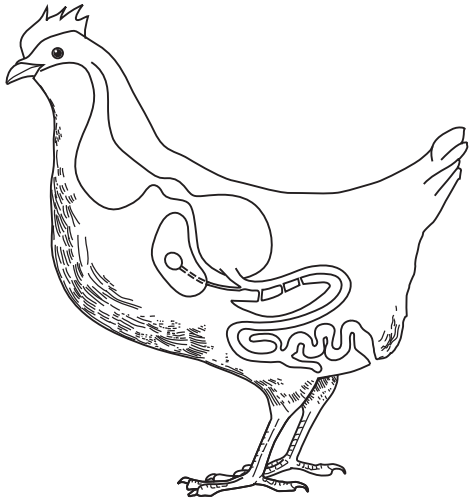
6 The diagram shows the digestive system of a hen.



Thomas keeps poultry.
He feeds them on Alleyne's Awesome Pellets.

Alleyne's Awesome Pellets

Carbohydrates	**25%**
Protein	**19%**
Fats	**5%**
Fibre	**50%**
Vitamins A, C, E	**<1%**
Calcium	**<1%**

Using the information provided, and your knowledge, explain what happens to these pellets as they pass through the hen's digestive system.

The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

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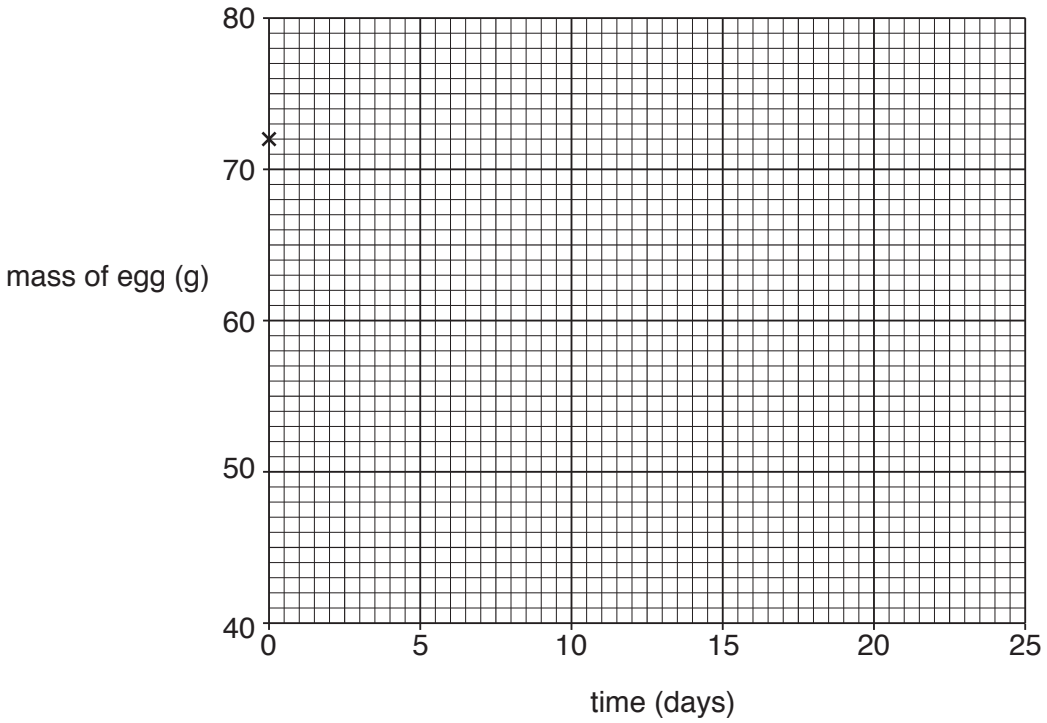
7 **(a)** The incubation period for fertilised hens' eggs is 21 days.

A student measured the mass of one egg during the incubation period.

The results are shown below.

Day	0	5	12	19
Mass (g)	72	70	67	60

(i) Plot these results using data from the table. The first one has been done for you.



[1]

(ii) Use your graph to predict the mass of the egg at 21 days.

Predicted mass: ..... g **[1]**

(b) The student was surprised by these results.

State **two** ways the student could improve the investigation.

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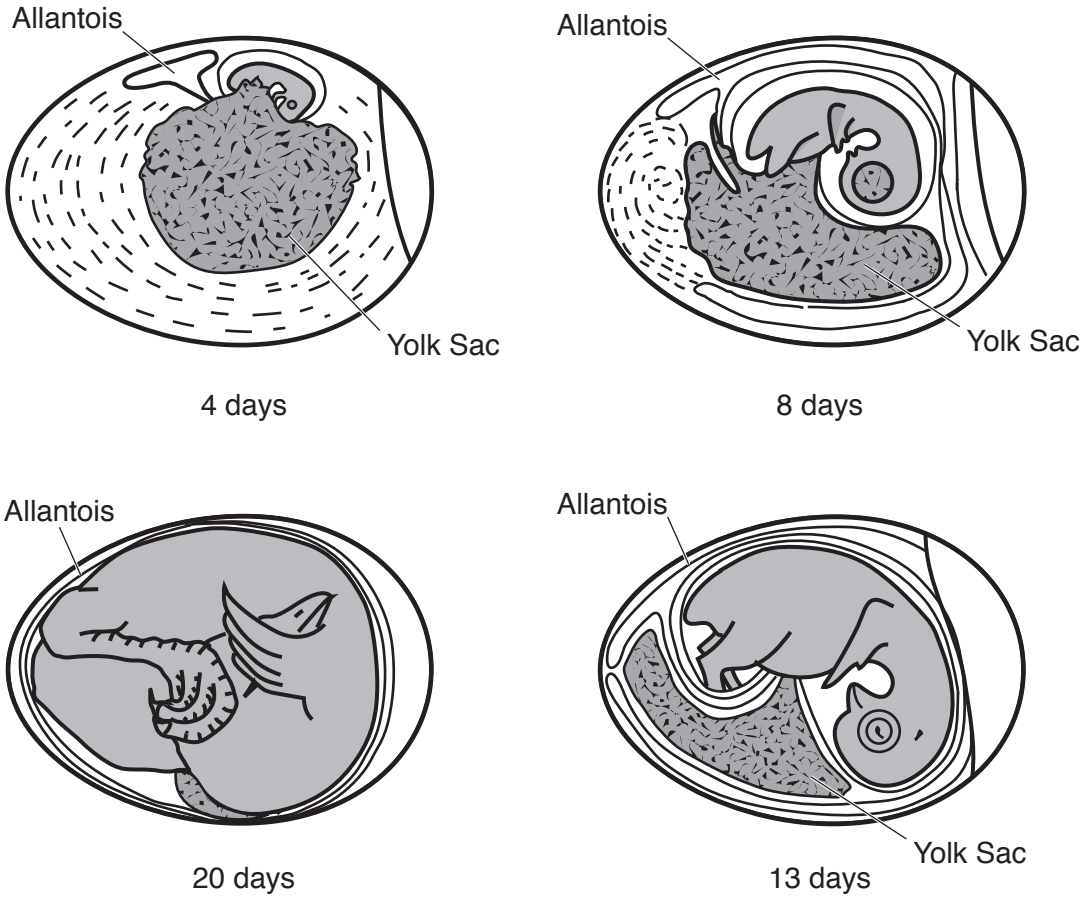
(c) The diagrams show a developing chick embryo.



Look at the diagrams and your graph.

Explain what happens to the yolk and allantoic sac during the development of the embryo.

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..... **[4]**

8 **(a)** The photograph shows Mushu, a pet bearded dragon.

Bearded dragons are a type of reptile.

Mushu's owner follows a special feeding schedule.

Day 1 = fruit and vegetables
Day 2 = 2 crickets (large insects)
Day 3 = nothing
Repeat.

The local pet shop sells tubs of crickets. Each tub contains 30 crickets.

If all the crickets stay alive in the tub, how many days will the crickets last Mushu's owner?

..... days **[1]**

(b) Mushu's owner reads the following advice:

Bearded dragons love crickets. It is a good idea to 'gut load' the crickets first by feeding them with your waste fruit and vegetables. Then sprinkle the crickets with 'Rep Sup' just before feeding them to your bearded dragon.

(i) Suggest why the article recommends 'gut loading' the crickets before feeding them to Mushu.

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..... **[2]**

(ii) Explain the importance of sprinkling 'Rep Sup' on the crickets before feeding them to Mushu.

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..... **[2]**

(c) Mushu becomes ill after being handled by the owner's friend.

Suggest a reason why Mushu became ill and how it might have been prevented.

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..... **[2]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).