

Please write clearly in block capitals.

Centre number

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Candidate signature

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I declare this is my own work.

GCSE BIOLOGY

Higher Tier Paper 2

8461/2H

Predicted Practice Paper

Time allowed: 1 hour 45 minutes

IMPORTANT — PLEASE READ: PREDICTED PRACTICE PAPER — not an official AQA paper, not a past paper, and not endorsed by or affiliated with AQA. All questions are original. Topics were chosen by analysing previous exam papers, but they are NOT guaranteed to appear in any real examination. Revise the full specification.

Materials

For this paper you must have:

- a ruler
- a scientific calculator

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 100.
- You are expected to use a calculator where appropriate.

Advice

- In all calculations, show clearly how you work out your answer.

Turn over

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Strawberry plants can reproduce sexually by producing seeds, or asexually using runners.

(a) Give one difference between sexual reproduction and asexual reproduction.

----- (1)

(b) Name the type of cell division that produces gametes.

----- (1)

(c) Describe what happens to the number of chromosomes during meiosis.

----- (2)

(d) Define the term genome.

----- (2)

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(e) A farmer wants to grow a large number of strawberry plants that are all identical to a plant which produces large, sweet strawberries. Explain why the farmer should use asexual reproduction and not sexual reproduction.

----- (3)

(Total for Question 1 is 9 marks)

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Turn over

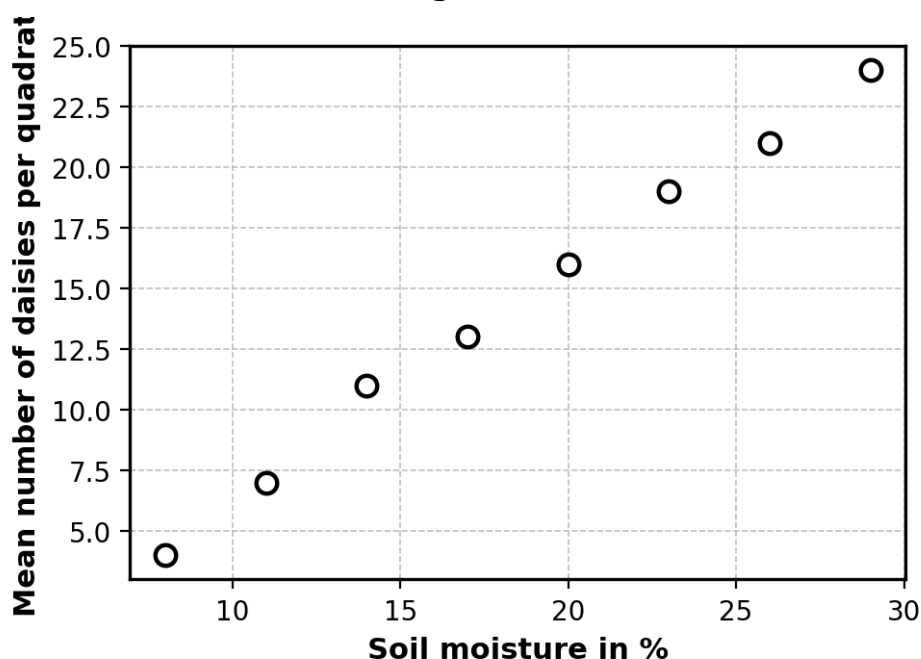
2 A class investigated the distribution of daisies on a school field. They placed quadrats at 2 m intervals along a 20 m transect and counted the number of daisies in each quadrat. At each position they also measured the soil moisture using a soil moisture meter. Table 1 shows their results.

Table 1

Soil moisture in %	8	11	14	17	20	23	26	29
Mean number of daisies per quadrat	4	7	11	13	16	19	21	24

Figure 1 shows the results as a scatter graph.

Figure 1



(a) Give one abiotic factor, other than soil moisture, that could affect the distribution of daisies.

(1)

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(b) The students placed three quadrats at each position along the transect. Explain why they placed more than one quadrat at each position.

----- (2)

(c) At one position the numbers of daisies counted in the three quadrats were 24, 27 and 21. Calculate the mean number of daisies at this position.

----- (2)

(d) Describe the relationship shown in Figure 1. Suggest one explanation for this relationship.

----- (3)

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(e) Suggest one improvement the students could make to the investigation. Explain how your improvement would make the conclusion more valid.

----- (2)

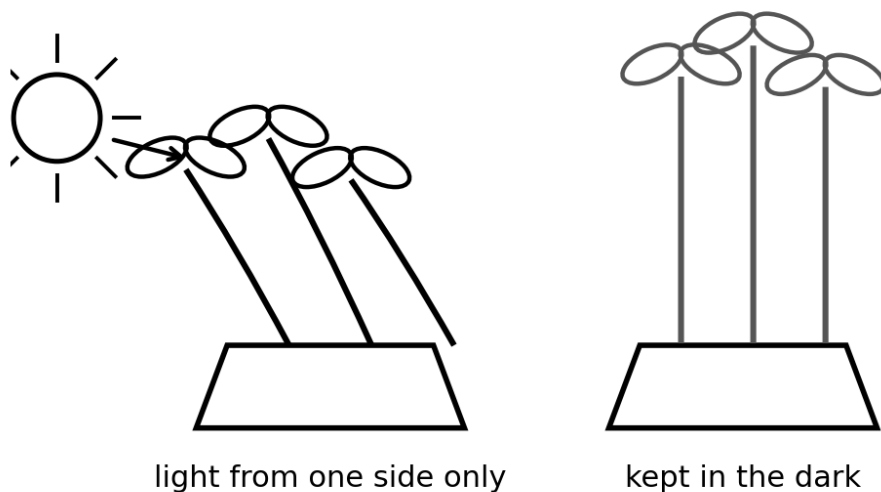
(Total for Question 2 is 10 marks)

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Turn over

3 A student investigated the response of cress seedlings to light. The student placed one group of seedlings where they received light from one side only. A second group of seedlings was kept in the dark. Figure 1 shows the appearance of the two groups of seedlings after 4 days.

Figure 1



(a) Describe how the student could investigate the effect of light on the growth of newly germinated seedlings. You should include details of the different light conditions, the measurements taken and the variables to control.

(6)

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(b) Explain the appearance of the seedlings that received light from one side only in Figure 1.

----- (3)

(c) A selective weedkiller contains a synthetic plant hormone similar to auxin. It is sprayed onto lawns to kill broad-leaved weeds, but it does not harm the grass. Suggest why the weedkiller kills the broad-leaved weeds but does not harm the grass.

----- (3)

(Total for Question 3 is 12 marks)

Turn over

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4 Two students investigated the effect of caffeine on reaction time. One student held a ruler vertically above the other student's open hand. The ruler was dropped without warning and the second student caught it as quickly as possible. The distance the ruler fell was converted into a reaction time. The test was repeated five times before drinking a caffeinated drink and five times after drinking the caffeinated drink. Table 1 shows the results.

Table 1

	Reaction time in seconds				
Before drinking the caffeinated drink	0.24	0.27	0.23	0.45	0.25
After drinking the caffeinated drink	0.19	0.21	0.18	0.20	0.22

(a) Catching the ruler is an example of a reflex action. The stages of a reflex arc are listed below, but they are not in the correct order.
 effector — sensory neurone — receptor — motor neurone — relay neurone
 Write the stages in the correct order.

(2)

(b) Calculate the mean reaction time before drinking the caffeinated drink. Exclude the anomalous result. Give your answer to 2 significant figures.

(2)

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(c) Explain why the students repeated the test five times each.

----- (2)

(d) The students concluded that caffeine decreases reaction time. Their teacher says more evidence is needed before this conclusion is valid. Suggest two improvements to the method. Explain how each improvement would make the conclusion more valid.

----- (4)

(Total for Question 4 is 10 marks)

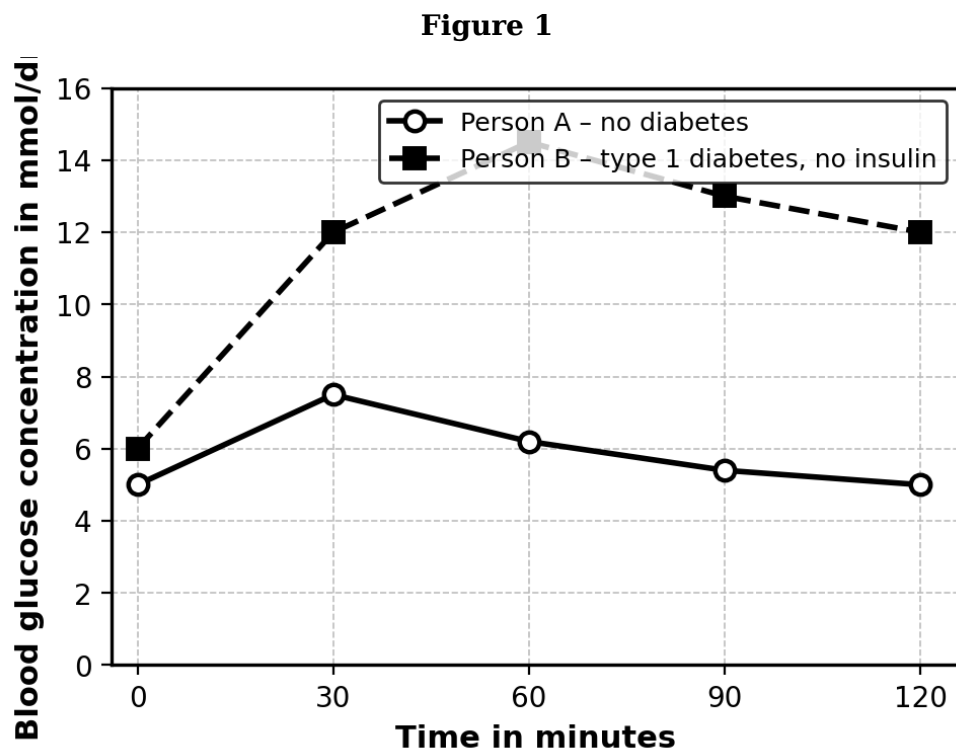
Turn over

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5 A study measured the blood glucose concentration of two adults after they each ate the same meal.

Person A does not have diabetes. Person B has type 1 diabetes and did not take insulin with the meal.

Figure 1 shows the results.



(a) Name the hormone that lowers blood glucose concentration. Name the organ that produces this hormone.

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

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(b) Describe what happens in the body when blood glucose concentration rises above the normal level.

----- (3)

(c) Use Figure 1 to calculate the difference in blood glucose concentration between person A and person B at 60 minutes.

----- (2)

(d) Explain how the body increases blood glucose concentration when it falls too low.

----- (2)

DO NOT WRITE IN THIS AREA

(e) A woman is finding it difficult to become pregnant. Her doctor prescribes the hormone FSH. Explain how FSH and IVF treatment could help the woman become pregnant.

----- (3)

(Total for Question 5 is 12 marks)

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Turn over

6 Polydactyly is an inherited disorder in which a person is born with extra fingers or toes.

It is caused by a dominant allele. The allele for polydactyly is represented by P. The allele for the normal number of fingers and toes is represented by p.

Table 1 is a Punnett square.

Table 1

	p	p
P		
p		

(a) A mother has polydactyly and has the genotype Pp. The father does not have polydactyly and has the genotype pp. Complete the Punnett square in Table 1 to show the possible genotypes of their children.

..... (2)

(b) Calculate the probability that the couple's next child will have polydactyly. Give your answer as a percentage.

.....
 (2)

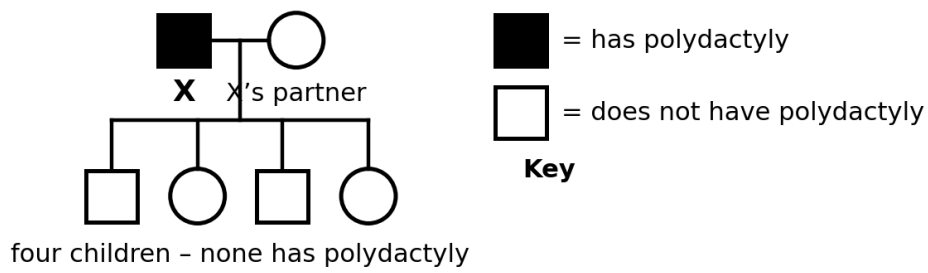
(c) Explain why the probability of having a child with polydactyly is the same for every child the couple has.

.....

 (2)

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Figure 1



(d) Figure 1 shows the family of person X. Person X has polydactyly. X's partner does not have polydactyly. They have four children, none of whom has polydactyly. Deduce the genotype of person X. Explain your answer.

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(2)

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(e) Cystic fibrosis is caused by a recessive allele. A couple are both carriers of cystic fibrosis. There is a 1 in 4 chance that their child will have cystic fibrosis. Explain how a Punnett square can be used to show this. Draw the Punnett square as part of your answer.

----- (3)

(Total for Question 6 is 11 marks)

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Turn over

7 MRSA is a bacterium that is resistant to several antibiotics. Infections caused by MRSA are difficult to treat.

(a) Explain how a population of bacteria can become resistant to an antibiotic.

(6)

(b) Suggest one measure used in hospitals to reduce the spread of MRSA. Explain how the measure reduces the spread.

(2)

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(c) Fossils provide evidence for evolution. Describe how the fossil of an animal can be formed.

----- (2)

(d) Give two reasons why a species may become extinct.

----- (2)

(Total for Question 7 is 12 marks)

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Turn over

8 An area of tropical rainforest is being cleared so that crops can be grown. Table 1 shows the biomass at two trophic levels in the rainforest before it was cleared.

Table 1

Trophic level	Biomass in kg
Producers (trees)	9000
Primary consumers	720

(a) Evaluate the effects of clearing the rainforest to grow crops on biodiversity.

(6)

(b) Calculate the percentage efficiency of biomass transfer between the producers and the primary consumers.

(2)

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(c) Explain why the efficiency of biomass transfer between trophic levels is less than 100%.

----- (2)

(d) The cleared trees are burned. Explain how burning the trees contributes to global warming.

----- (2)

(Total for Question 8 is 12 marks)

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Turn over

9 Type 1 diabetes is caused by the immune system destroying the cells in the pancreas that produce insulin.

Scientists have developed monoclonal antibodies that attach to the immune cells. This stops the immune cells destroying the cells in the pancreas that produce insulin.

(a) Describe how monoclonal antibodies are produced.

----- (2)

(b) Explain how monoclonal antibodies could be used to measure the level of insulin in a blood sample.

----- (2)

(c) Explain how insulin controls blood glucose concentration after a meal.

----- (2)

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(d) Evaluate the use of this monoclonal antibody treatment for type 1 diabetes. In your answer, compare it with the current treatment of daily insulin injections.

(6)

(Total for Question 9 is 12 marks)

END OF QUESTIONS

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