

FOR OFFICIAL USE

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Total for
Sections
B and C

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X007/301

NATIONAL
QUALIFICATIONS
2011

WEDNESDAY, 1 JUNE
1.00 PM – 3.30 PM

BIOLOGY
HIGHER

Fill in these boxes and read what is printed below.

Full name of centre

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Town

--

Forename(s)

--

Surname

--

Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

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SECTION A—Questions 1–30 (30 marks)

Instructions for completion of Section A are given on page two.

For this section of the examination you must use an **HB pencil**.

SECTIONS B AND C (100 marks)

- (a) All questions should be attempted.
(b) It should be noted that in **Section C** questions 1 and 2 each contain a choice.
- The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, **and must be written clearly and legibly in ink**.
- Additional space for answers will be found at the end of the book. If further space is required, supplementary sheets may be obtained from the Invigilator and should be inserted inside the **front** cover of this book.
- The numbers of questions must be clearly inserted with any answers written in the additional space.
- Rough work, if any should be necessary, should be written in this book and then scored through when the fair copy has been written. If further space is required a supplementary sheet for rough work may be obtained from the Invigilator.
- Before leaving the examination room you must give this book to the Invigilator. If you do not, you may lose all the marks for this paper.



Read carefully

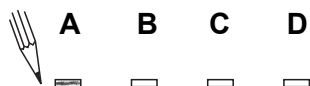
- 1 Check that the answer sheet provided is for **Biology Higher (Section A)**.
- 2 For this section of the examination you must use an **HB pencil**, and where necessary, an eraser.
- 3 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate Number) and **Centre Name** printed on it.
Do not change any of these details.
- 4 If any of this information is wrong, tell the Invigilator immediately.
- 5 If this information is correct, **print** your name and seat number in the boxes provided.
- 6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then, using your pencil, put a horizontal line in the space provided (see sample question below).
- 7 There is **only one correct** answer to each question.
- 8 Any rough working should be done on the question paper or the rough working sheet, **not** on your answer sheet.
- 9 At the end of the examination, put the **answer sheet for Section A inside the front cover of this answer book**.

Sample Question

The apparatus used to determine the energy stored in a foodstuff is a

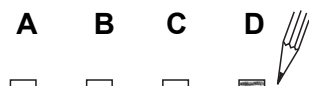
- A calorimeter
- B respirometer
- C klinostat
- D gas burette.

The correct answer is **A**—calorimeter. The answer **A** has been clearly marked in **pencil** with a horizontal line (see below).



Changing an answer

If you decide to change your answer, carefully erase your first answer and using your pencil fill in the answer you want. The answer below has been changed to **D**.



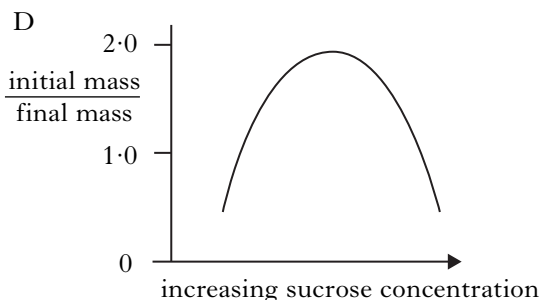
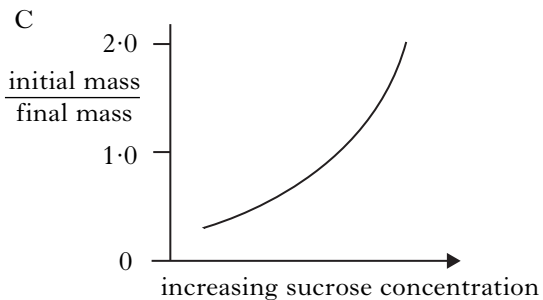
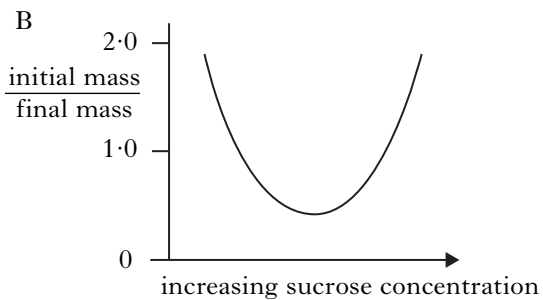
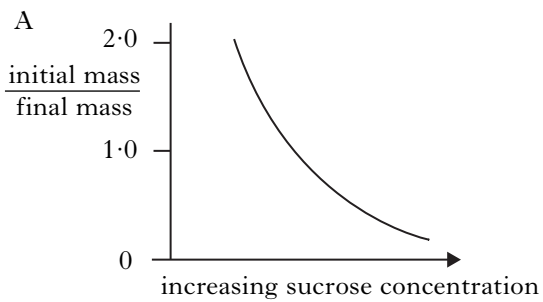
SECTION A

All questions in this section should be attempted.

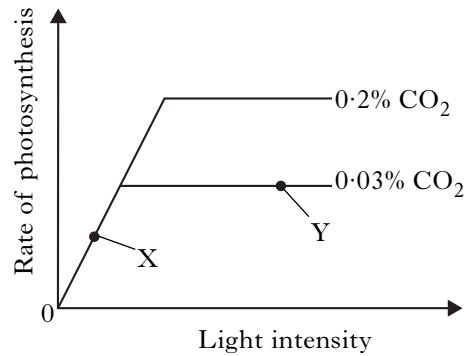
Answers should be given on the separate answer sheet provided.

1. Equal sized pieces of potato were weighed then placed in different concentrations of sucrose. After 24 hours the potato pieces were removed and reweighed. For each potato piece the initial mass divided by the final mass was calculated.

Which graph correctly represents the change in initial mass divided by final mass which would be expected as the concentration of sucrose increases?



2. The graph below shows the rate of photosynthesis at two different levels of carbon dioxide concentration at 20 °C.

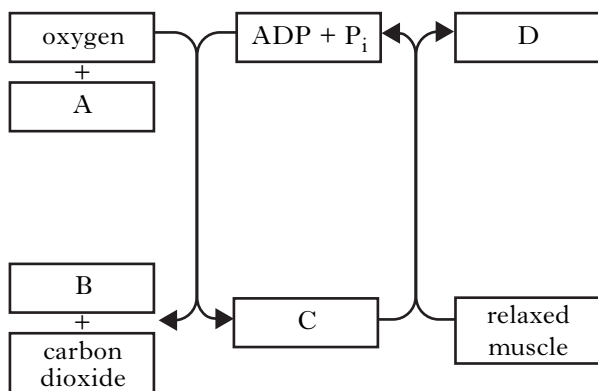


From the evidence given, identify the factors most likely to be limiting the rate of photosynthesis at points X and Y on the graph.

	<i>Point X</i>	<i>Point Y</i>
A	Light intensity	CO ₂ concentration
B	Temperature	Light intensity
C	CO ₂ concentration	Temperature
D	Light intensity	Temperature

[Turn over

3. The diagram below represents a summary of respiration in a mammalian muscle cell.

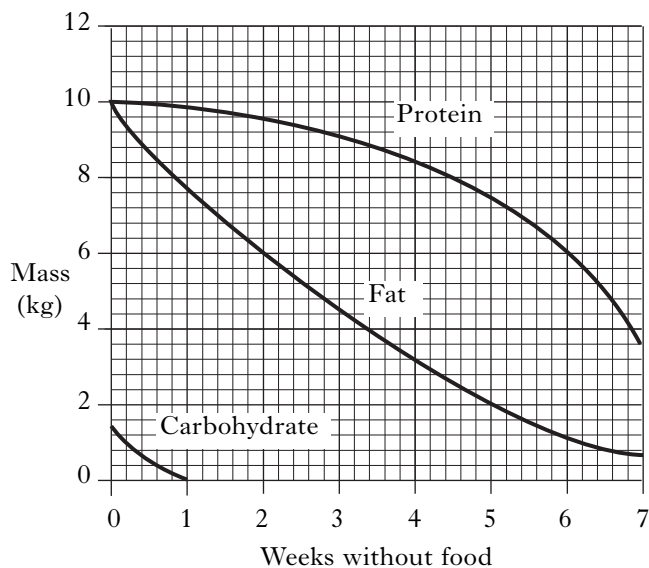


Which box represents ATP?

4. Which of the following produces water?

- A Krebs cycle
- B Glycolysis
- C Photolysis
- D Cytochrome system

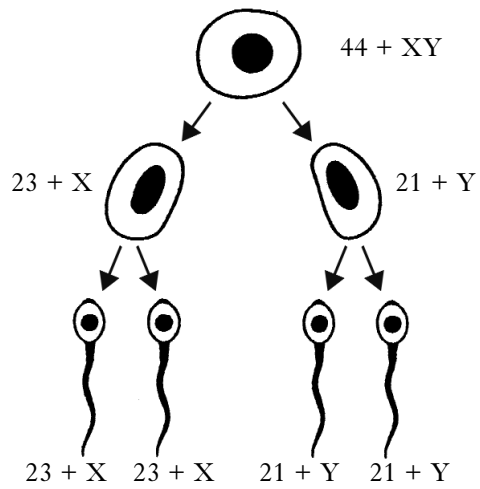
5. The graph below shows changes which occur in the masses of protein, fat and carbohydrate in the body of a hibernating mammal during seven weeks without food.



What percentage of the original mass of fat was used up between weeks 2 and 5?

- A 33%
 - B 40%
 - C 67%
 - D 80%
6. Which of the following compounds are linked by peptide bonds to form more complex molecules?
- A Bases
 - B Nucleic acids
 - C Nucleotides
 - D Amino acids
7. A DNA molecule consists of 4000 nucleotides, of which 20% contain the base adenine. How many of the nucleotides in this DNA molecule will contain guanine?
- A 800
 - B 1000
 - C 1200
 - D 1600

14. The diagram below shows the chromosome complement of cells during the development of abnormal human sperm.

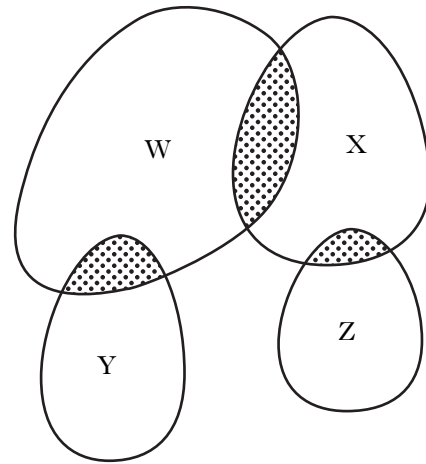


A sperm with chromosome complement 23 + X fertilises a normal haploid egg. What is the chromosome number and sex of the resulting zygote?

	<i>Chromosome number</i>	<i>Sex of zygote</i>
A	24	female
B	46	female
C	46	male
D	47	female

15. The diagram below represents the areas of interbreeding of 4 groups of birds, W, X, Y and Z.

Interbreeding takes place in the shaded areas.



How many species are present?

- A 1
- B 2
- C 3
- D 4

16. In an investigation, peppered moths of both light and dark varieties were marked and released in three woodland areas. The numbers recaptured after 24 hours are shown in the table below.

Woodland area	Variety released	Number released	Number recaptured
1	Light	70	35
	Dark	30	15
2	Light	450	150
	Dark	300	150
3	Light	120	12
	Dark	220	22

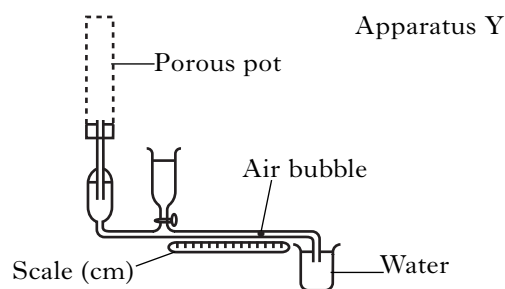
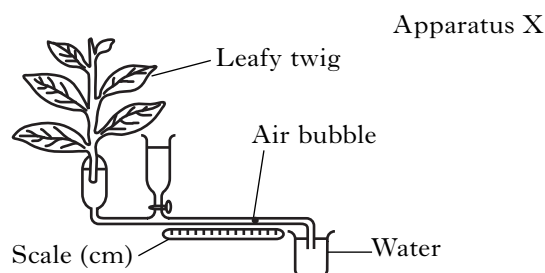
The woodland areas were graded as polluted if the percentage of dark moths recaptured was greater than the percentage of light moths recaptured.

Which of the woodland areas were graded as polluted?

- A 1 and 2 only
- B 2 and 3 only
- C 2 only
- D 1 and 3 only

17. Apparatus X shown below is used in investigations into the rate of transpiration of a leafy twig.

Apparatus Y is a control used in such investigations.



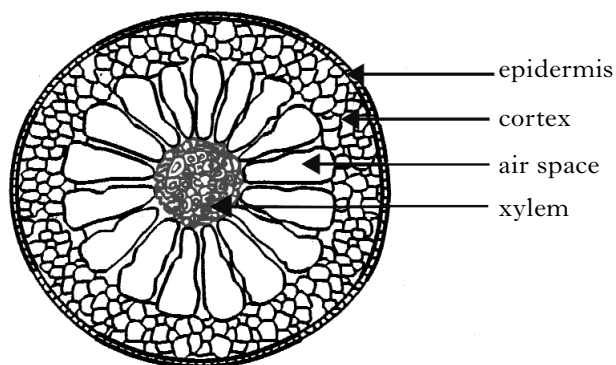
The distance travelled by the air bubble in a given time measures the rate of transpiration in the leafy twig and the rate of evaporation from the porous pot.

Which line in the table below shows how the distance travelled by the air bubble changes when apparatus X and Y are moved from light to dark with all other variables kept constant?

	Distance travelled by air bubble (cm per minute)	
	Apparatus X	Apparatus Y
A	decreases	decreases
B	decreases	unchanged
C	increases	unchanged
D	increases	increases

[Turn over

18. The diagram below shows a cross section through the stem of a hydrophyte.



The arrangement of the xylem is of benefit to the plant because it

- A gives the stem flexibility in flowing water
- B allows uptake of water through the cortex
- C gives the stem increased support
- D allows transport of sugars to the roots.

19. The statements below relate to bird behaviour.

- 1 Blackbirds sing to mark their territory.
- 2 Arctic and common terns form large mixed breeding colonies.
- 3 Black grouse gather on open areas of short grass and males display to females.
- 4 Great skuas chase other seabirds and force them to drop their food.

Which of the above statements are related to intraspecific competition?

- A 1 and 2 only
- B 1 and 3 only
- C 2 and 4 only
- D 3 and 4 only

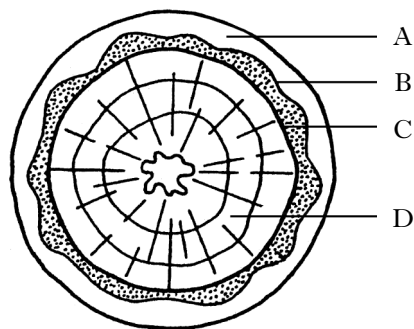
20. When the intensity of grazing by herbivores increases in a grassland ecosystem, diversity of plant species may increase as a result.

Which statement explains this observation?

- A Few herbivores are able to eat every plant species present.
- B Grazing stimulates growth in some plant species.
- C Vigorous plant species are eaten so less competitive species can now thrive.
- D Plant species with defences against herbivores are selected.

21. The diagram below shows a section through a woody twig.

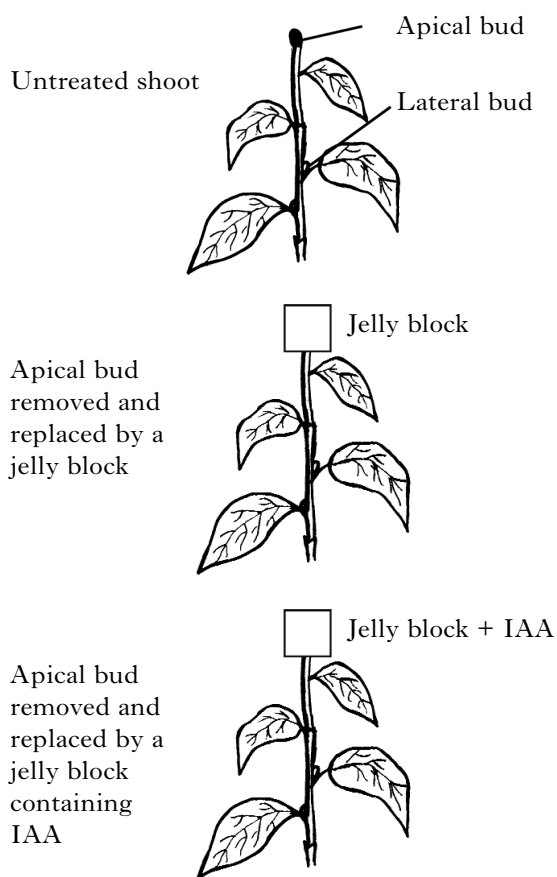
Which label shows the position of a meristem?



22. In the condition phenylketonuria (PKU), the human body is unable to

- A synthesise phenylalanine from tyrosine
- B secrete phenylalanine from cells
- C absorb phenylalanine into the bloodstream
- D convert phenylalanine to tyrosine.

23. The diagram below shows an experiment to investigate the role of IAA in the growth of lateral buds.



Which line in the table correctly shows the expected growth of lateral buds in the experiment?

- ✓ = growth of lateral buds
 ✗ = no growth of lateral buds

	<i>Untreated shoot</i>	<i>Apical bud removed and replaced by jelly block</i>	<i>Apical bud removed and replaced by a jelly block containing IAA</i>
A	✗	✓	✗
B	✗	✗	✓
C	✓	✓	✗
D	✓	✗	✓

24. The table below shows the results of an experiment to investigate the effect of IAA on the development of roots from sections of pea stems.

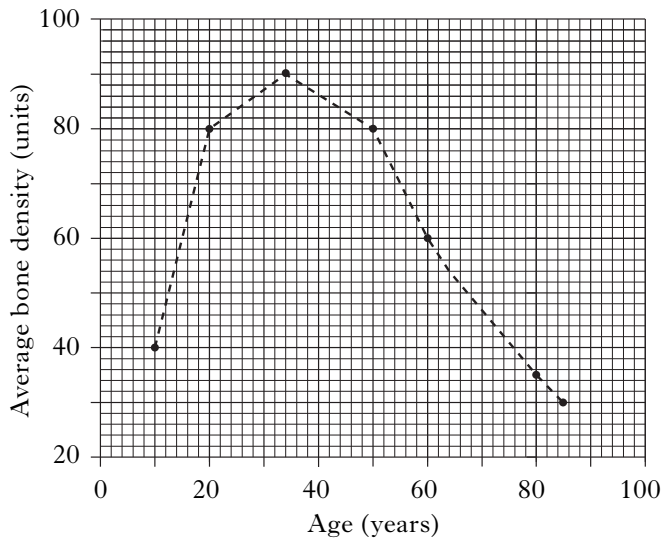
<i>Concentration of IAA (units)</i>	<i>Average number of roots per stem section</i>
2	2.0
4	2.2
6	3.8
8	5.7
10	6.6

The greatest percentage increase in the average number of roots per stem section is caused by an increase in IAA concentration (units) from

- A 2 to 4
 B 4 to 6
 C 6 to 8
 D 8 to 10.

[Turn over

25. The graph below shows how female bone density changes with age.

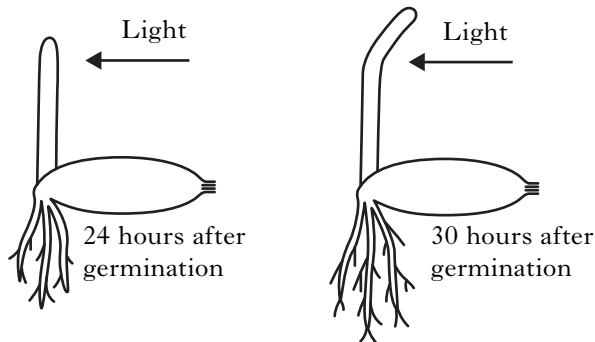


When a female's bone density falls to 60% of its maximum, there is an increased chance of bone breakage.

This occurs at

- A 60 years
- B 64 years
- C 76 years
- D 84 years.

26. The diagrams below represent the same barley seedling at 24 hours and 30 hours after germination.



Which of the following is used to describe the growth movement observed?

- A Photoperiodism
- B Etiolation
- C Phototropism
- D Germination

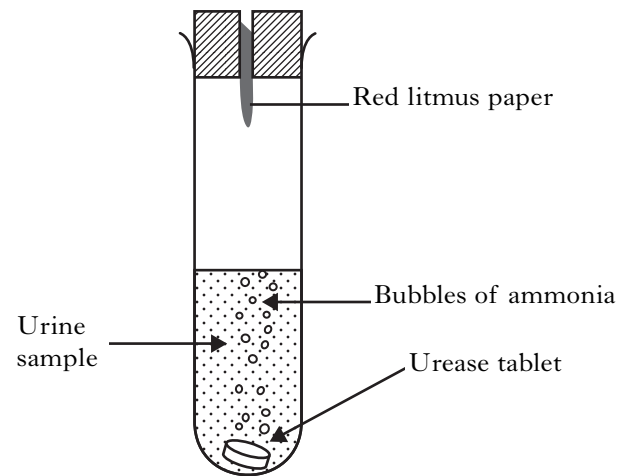
27. Which line in the table below shows the critical factors for the onset of flowering in short and long day plants?

	<i>Short day plants</i>	<i>Long day plants</i>
A	length of light period	length of light period
B	length of dark period	length of dark period
C	length of light period	length of dark period
D	length of dark period	length of light period

28. An experiment was carried out to estimate the concentration of urea present in urine samples as shown in the diagram below.

The method involved adding tablets containing the enzyme urease to urine samples. Urease breaks down urea to produce ammonia.

The time taken for the ammonia produced to turn red litmus to blue was then measured.



Which **two** factors would have to be kept the same throughout the investigation?

- A Size of tablet and concentration of urea
- B Concentration of urea and time taken for red litmus to turn blue
- C Size of tablet and volume of urine used
- D Volume of urine used and time taken for red litmus to turn blue

29. Which line in the table below shows density-dependent and density-independent factors?

	<i>Density-dependent</i>	<i>Density-independent</i>
A	disease and competition	flood and drought
B	fire and flood	food supply and predation
C	food supply and disease	competition and predation
D	competition and fire	flood and drought

30. Which line in the table below identifies the characteristics of a climax community?

	<i>Characteristic of climax community</i>		
	<i>Biomass</i>	<i>Species diversity</i>	<i>Food webs</i>
A	low	high	simple
B	high	low	complex
C	low	low	simple
D	high	high	complex

Candidates are reminded that the answer sheet MUST be returned INSIDE the front cover of this answer book.

[Turn over

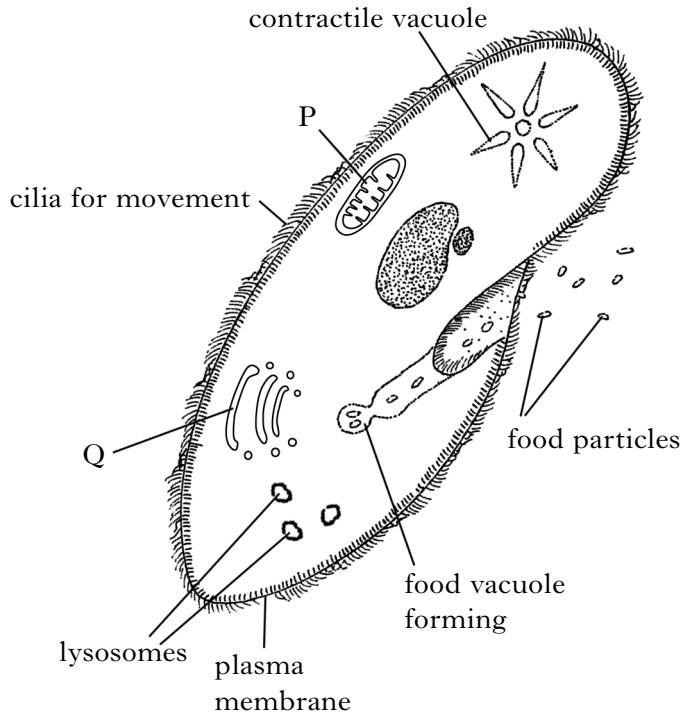
Marks

SECTION B

All questions in this section should be attempted.

All answers must be written clearly and legibly in ink.

1. The diagram below shows *Paramecium*, a unicellular organism found in fresh water.



- (a) Identify organelles P and Q.

P _____

Q _____

2

- (b) (i) Name **two** chemical components of the plasma membrane.

1 _____

2 _____

1

- (ii) Give a property of the plasma membrane which is related to its role in osmosis.

1

Marks

1. (continued)

- (c) *Paramecium* has contractile vacuoles that fill with excess water which has entered the organism by osmosis. These vacuoles contract to remove this water from the organism.

The rate of contraction of the vacuoles is affected by the concentration of the solution in which the *Paramecium* is found.

In which solution would the highest rate of contraction of the vacuoles occur?

Underline the correct answer.

hypertonic hypotonic isotonic

1

- (d) *Paramecium* feeds on micro-organisms present in water.

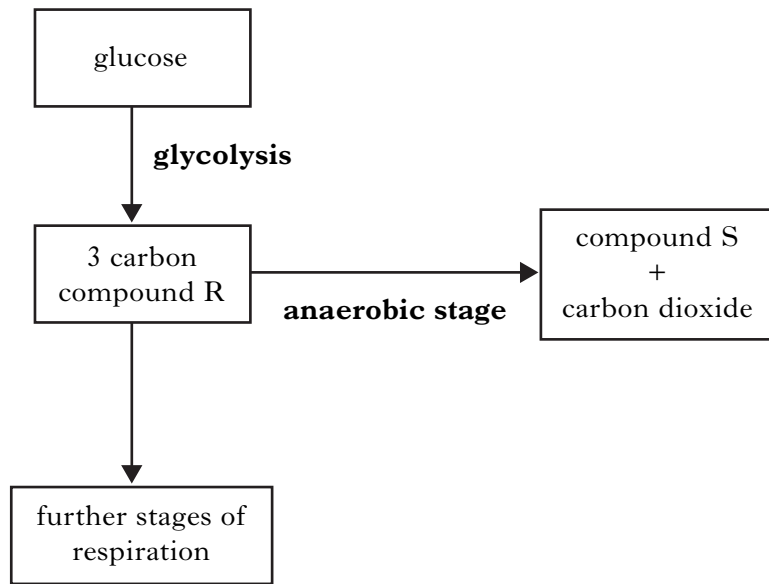
Use information from the diagram to describe how *Paramecium* obtains and digests food.

2

[Turn over

Marks

2. The diagram below shows an outline of respiration in yeast cells.



(a) State the location of glycolysis in yeast cells.

1

(b) Name **one** substance, other than glucose, which must be present for glycolysis to occur.

1

(c) Name compounds R and S.

R _____

1

S _____

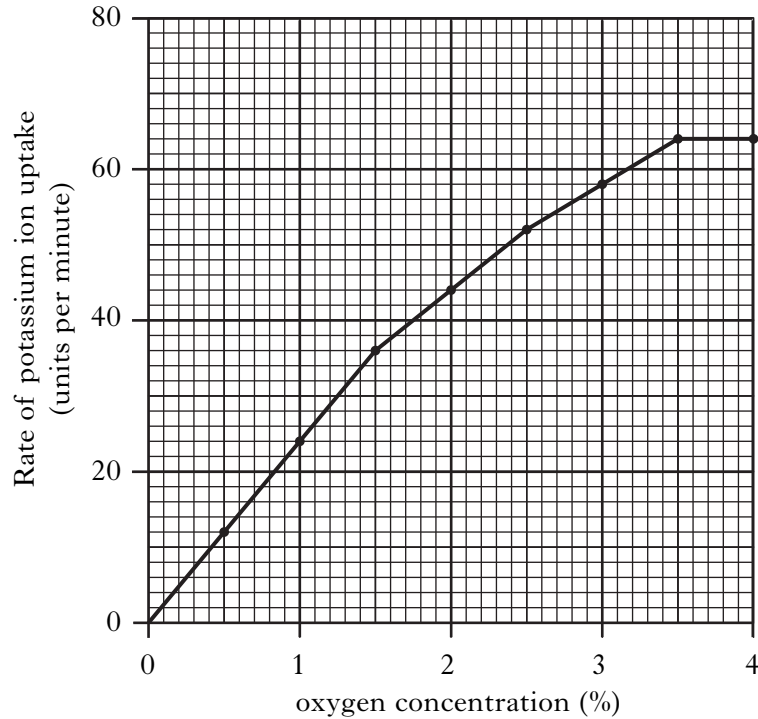
1

(d) Explain why the further stages of respiration cannot occur in anaerobic conditions.

1

Marks

3. The graph shows the rate of potassium ion uptake by human liver cells in different oxygen concentrations at 30 °C.



- (a) When the oxygen concentration is 1%, how many units of potassium would a cell take up in one hour?

Space for calculation

_____ units per hour **1**

- (b) Suggest a reason why the graph levels off at oxygen concentrations above 3.5%.

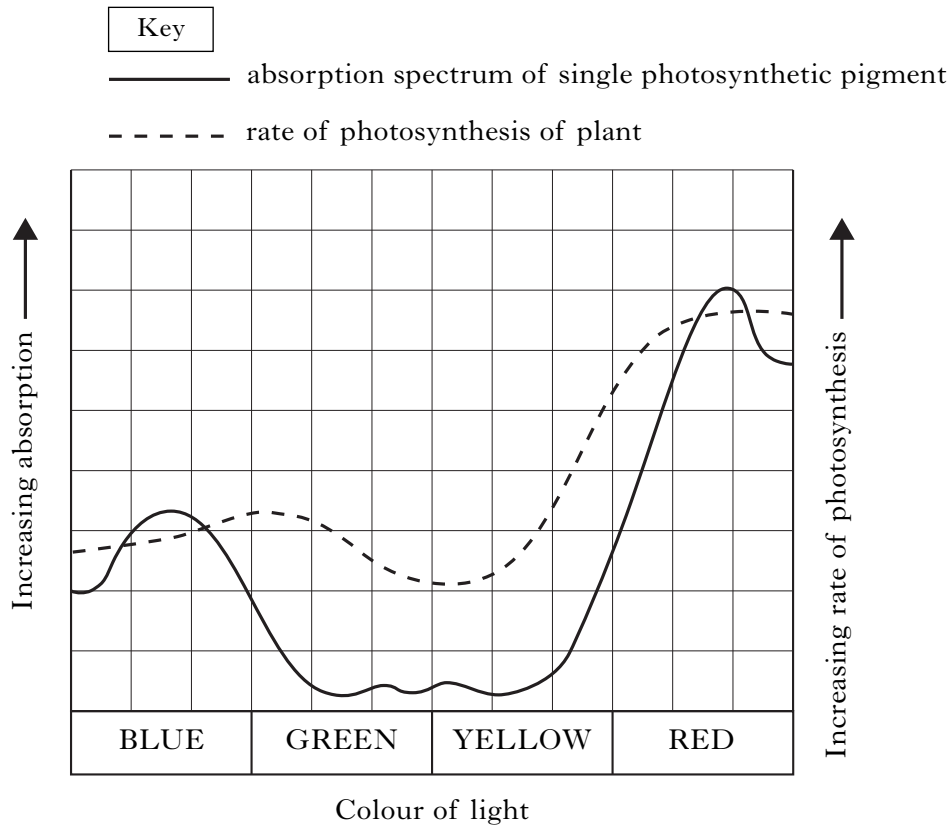
 _____ **1**

- (c) When the experiment was repeated at 20 °C, the potassium ion uptake decreased. Explain this observation.

 _____ **2**

Marks

4. (a) The diagram below shows the absorption spectrum of a single photosynthetic pigment from a plant and the rate of photosynthesis of the plant in different colours of light.



- (i) Leaves of this plant contain more than one photosynthetic pigment.
Use evidence from the graph to justify this statement.

1

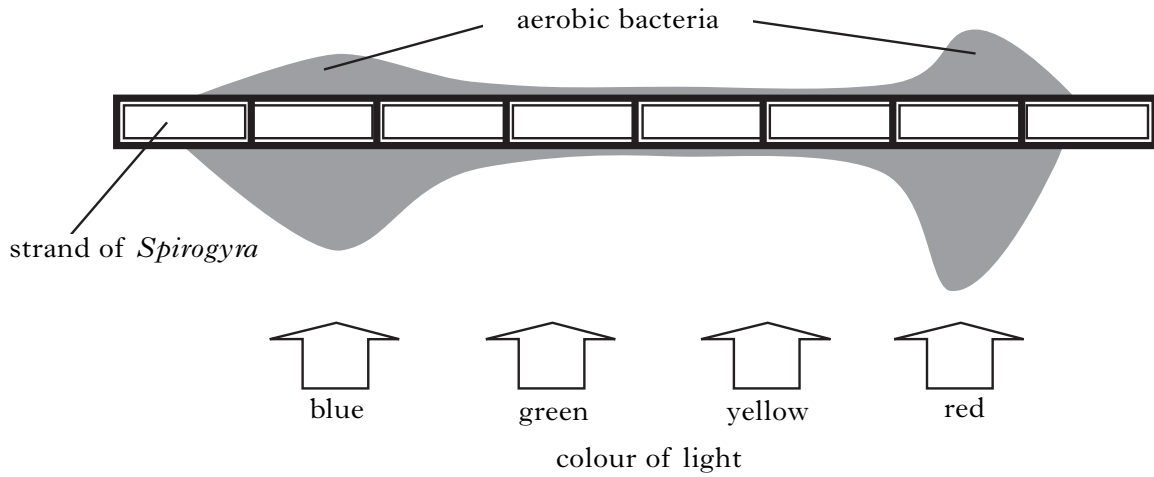
- (ii) Name a technique used to separate mixtures of photosynthetic pigments.

1

Marks

4. (continued)

(b) *Spirogyra* is a photosynthetic green alga which grows as a long strand of cells. A strand of *Spirogyra* was placed into water containing aerobic bacteria. Different parts of the strand were exposed to different colours of light. After a period of time, the bacteria had moved into the positions shown in the diagram below.



Explain the distribution of aerobic bacteria shown in the diagram.

2

[Turn over

Marks

5. (a) Eye colour in fruit flies is sex-linked.

Red eye colour **R** is dominant to white eye colour **r**.

A heterozygous red-eyed female fly was crossed with a white-eyed male.

(i) Complete the grid by adding the genotypes of

1 the male and female gametes;

1

2 the possible offspring.

1

		<i>Female gametes</i>	
<i>Male gametes</i>			

(ii) Tick (✓) the box(es) to show all the expected phenotypes of the offspring from this cross.

red-eyed female white-eyed female
 red-eyed male white-eyed male

1

(iii) Explain why the actual phenotype **ratio** obtained from this cross could differ from the expected.

1

Marks

5. (continued)

(b) Genes K, L, M and N are located on the same chromosome in fruit flies.

The recombination frequencies of pairs of these genes are given in the table.

<i>Genes</i>	<i>Recombination frequency (%)</i>
K and L	18
N and L	25
M and N	17
L and M	8
K and N	7

Complete the diagram below to show the relative positions of genes L, M and N on the chromosome.



1

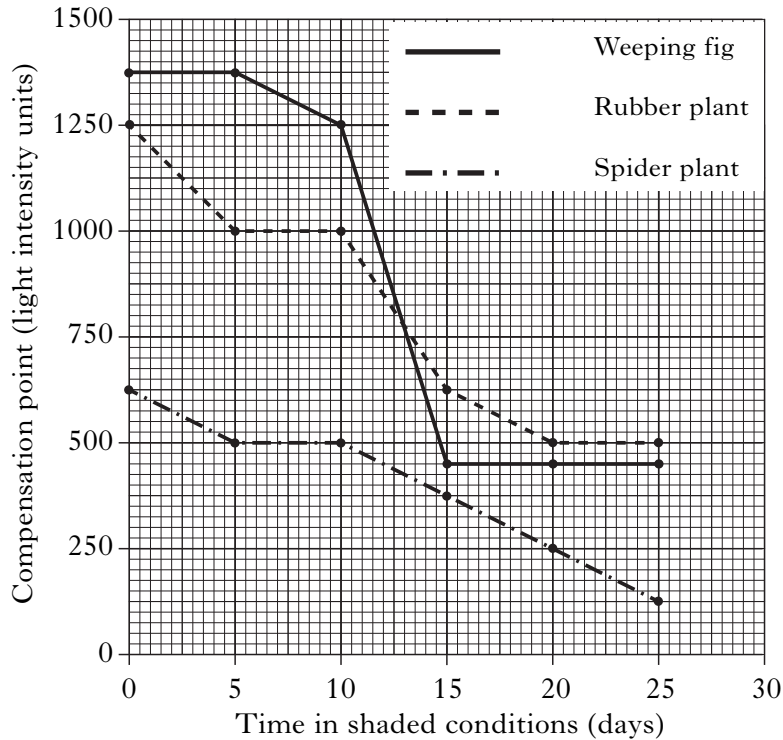
[Turn over

6. The compensation point is the light intensity at which a plant's carbon dioxide uptake by photosynthesis is equal to its carbon dioxide output from respiration.
- In some plant species, compensation point can be reduced when the plant is moved from bright light to shaded conditions.

Marks

Graph 1 shows how the compensation points of three species of plant changed over a 25 day period after they were moved from bright light into shaded conditions.

Graph 1



- (a) (i) Use values from **Graph 1** to describe the changes in compensation point of the weeping fig over the 25 day period.

2

- (ii) Calculate the percentage decrease in compensation point of the rubber plant over the 25 day period.

Space for calculation

_____ %

1

- (iii) Predict the compensation point of the spider plant at **28 days**.

_____ light intensity units

1

- (iv) Use evidence from the graph to explain why the rubber plant could not grow successfully in a constant light intensity of 400 light intensity units.

2

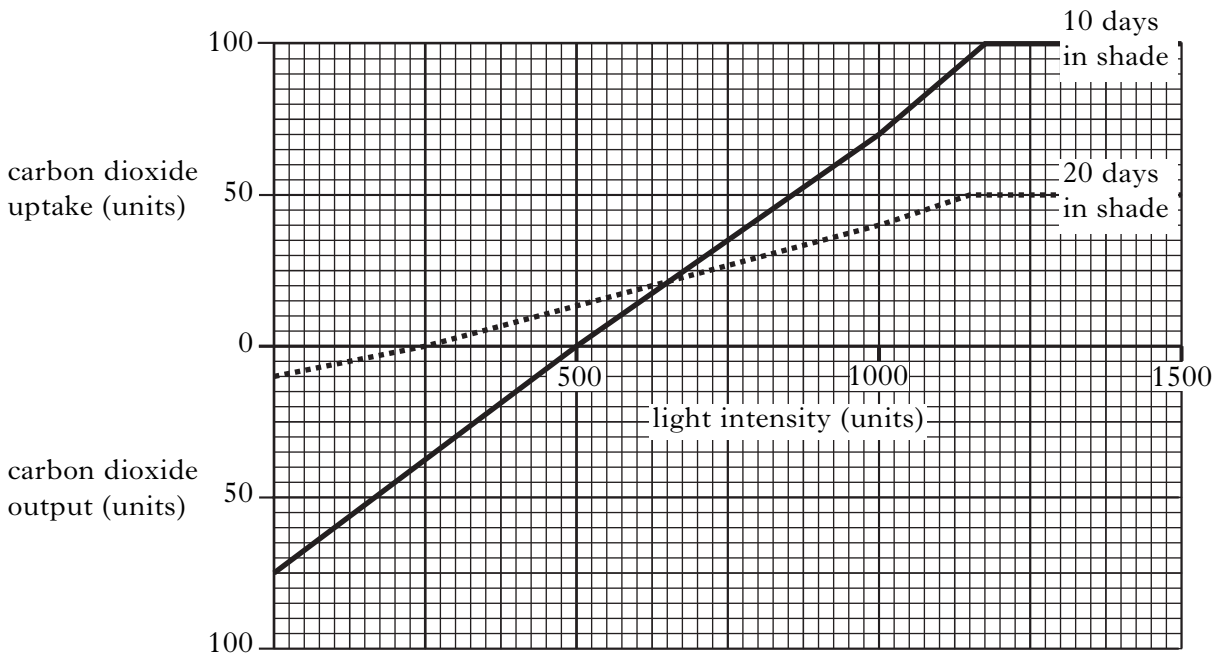
Marks

6. (continued)

- (b) After 10 days in shaded conditions, a plant of one species was placed into different light intensities and its carbon dioxide output and uptake were measured. This was repeated with another plant of the **same** species which had been in the shade for 20 days.

The results are shown in **Graph 2**.

Graph 2



- (i) Use all the data to identify the plant species referred to in **Graph 2**. Tick (✓) the correct box and give a reason for your choice.

weeping fig rubber plant spider plant

Reason

1

- (ii) From **Graph 2**, calculate how many times greater the carbon dioxide uptake of this plant was at 1000 units of light intensity after 10 days in shaded conditions compared with after 20 days in shaded conditions.

Space for calculation

_____ times

1

Marks

7. The table shows the base sequences of some mRNA codons and the amino acids for which they code.

<i>mRNA codon</i>			<i>Amino acid</i>
<i>first base</i>	<i>second base</i>	<i>third base</i>	
A	G	G	arginine
		C	serine
	A	A	lysine
		U	asparagine
	C	A	threonine
		C	threonine
	U	G	methionine
		U	isoleucine
C	G	A	arginine
		C	arginine
	A	G	glutamine
		U	histidine
	C	G	proline
		C	proline
	U	A	leucine
		U	leucine

- (a) (i) State the mRNA codon for methionine.

1

- (ii) Use information from the table to identify the common feature of all mRNA codons which code for the amino acid arginine.

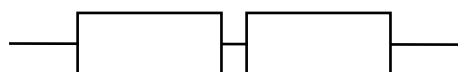
1

- (b) Complete the diagram below by naming the two amino acids corresponding to the bases on the strand of DNA shown.

Bases on strand of DNA



Corresponding amino acids



1

Marks

8. Mutation rate can be increased artificially using chemical agents.

(a) Give **another** example of a mutagenic agent.

1

(b) The table below shows the bases on part of a strand of DNA and the effects on the bases of four different gene mutations.

<i>Original DNA strand</i>	<i>Gene mutation</i>	<i>Mutated DNA strands</i>
A T C G C T A	1	A T C G G C T A
	2	A T C C T A
	3	A T C G C A A
	4	A T G C C T A

(i) Name the gene mutations which have caused the effects shown in the mutated strands.

gene mutation 1 _____

gene mutation 2 _____

gene mutation 3 _____

gene mutation 4 _____

2

(ii) Use numbers from the table to identify the **two** gene mutations that would result in the greatest changes to the structure of the protein coded for by the original DNA strand.

Explain how these mutations would lead to major changes in the structure of the protein.

Gene mutation numbers _____ and _____ .

1

Explanation _____

1

[Turn over

Marks

9. (a) The table shows behavioural adaptations of lions for obtaining food.

(i) Complete the table below by explaining how each adaptation is beneficial for obtaining food.

<i>Behavioural adaptation</i>	<i>Benefit for obtaining food</i>
Cooperative hunting	
Territorial behaviour	

2

(ii) These behavioural adaptations ensure that lions can forage economically. Explain what is meant by this statement in terms of energy gained and lost.

1

(iii) Lions hunt wildebeest, which live in large herds. Explain how living in large herds benefits the wildebeest in terms of predation by lions.

1

Marks

9. (continued)

(b) If a snail is disturbed, it withdraws into its shell and re-emerges a few minutes later.

(i) Name the type of behaviour shown by the withdrawal response.

1

(ii) What is the advantage to a snail of withdrawing into its shell?

1

[Turn over

10. Gibberellic acid (GA) is needed to break dormancy of rice grains allowing them to germinate.

An experiment was carried out to investigate the effects of GA on the germination of rice grains.

30 cm³ of different concentrations of GA solution was placed into separate beakers. 50 rice grains were added to each beaker. Each beaker was then covered with plastic film.

After 12 hours, the grains were removed from the solutions and evenly spaced in separate dishes on filter paper soaked with 20 cm³ of water.

The dishes were covered and kept in the dark for 10 days and the number of germinated grains in each dish was counted.

A second batch of grains was treated in the same way but these were left in the GA solutions for 36 hours.

The results are shown in the table.

Concentration of GA solution (mg per litre)	Number of rice grains germinated	
	After 12 hours in GA solution	After 36 hours in GA solution
0	5	6
5	7	14
10	16	31
20	23	35
30	28	41
60	31	43

(a) Identify **one** variable, not already described, that should be kept constant.

Marks

DO NOT
WRITE IN
THIS
MARGIN

1

(b) (i) Explain how the solution with 0 mg per litre GA acts as a control in this experiment.

1

(ii) Suggest why some germination occurs in the control.

1

(c) Identify a feature of the experimental procedure which ensured the reliability of the results.

1

Marks

10. (continued)

- (d) Predict how the concentration of GA in the beakers would have been affected if they had not been covered with plastic film.

Underline the correct answer and give a reason for your choice.

increased decreased stayed the same

Reason _____

1

- (e) Calculate the difference in **percentage** germination between the grains kept in the 5 mg GA per litre solution for 12 hours and those kept in the 30 mg GA per litre solution for 12 hours.

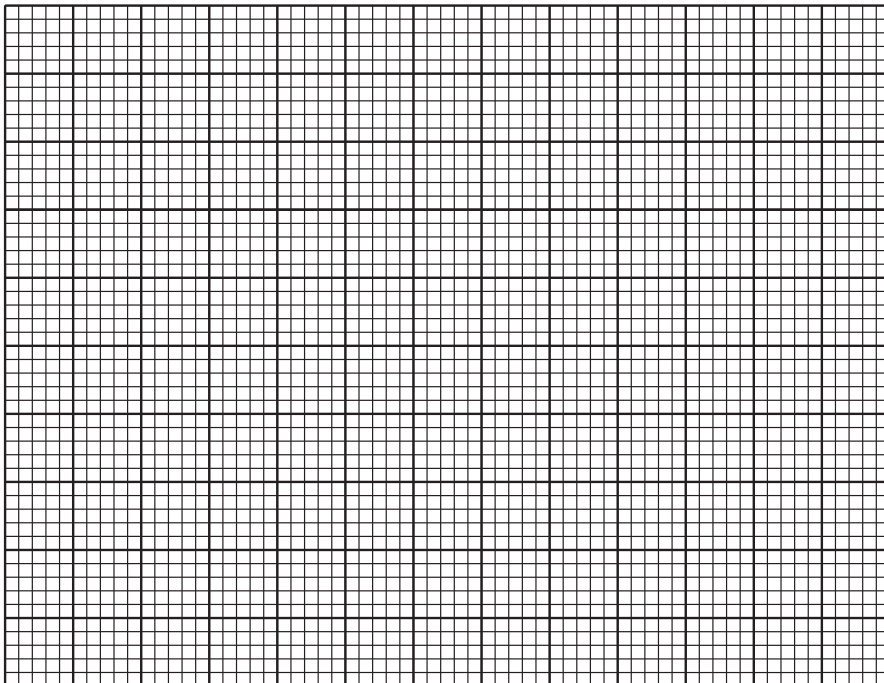
Space for calculation

_____ %

1

- (f) On the grid below, draw a line graph to show the number of grains germinated after 36 hours in the different concentration of GA solution.

(Additional graph paper, if required, will be found on *Page forty.*)



2

- (g) Give **two** conclusions which can be drawn from the results in the **table**.

1 _____

2 _____

2

Marks

10. (continued)

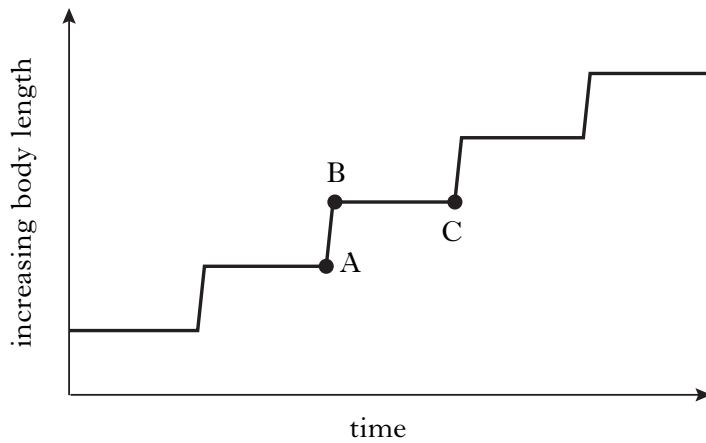
(h) GA induces the release of amylase in the germinating grains of plants such as rice and barley.

Name the site within the grains which produces amylase.

1

Marks

11. The graph below shows how the body length of a locust changes over time.



(a) Explain the growth pattern between points A and B and between points B and C shown on the graph.

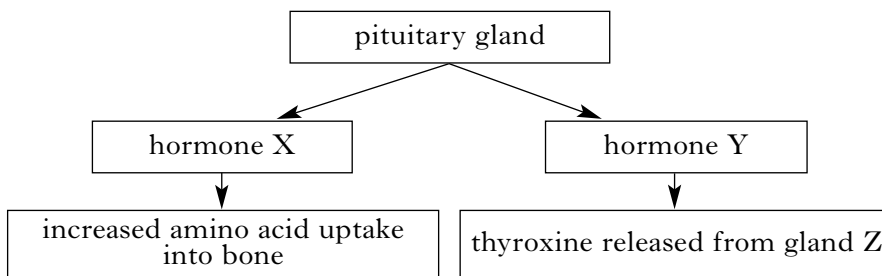
A and B _____

1

B and C _____

1

(b) The diagram shows information about hormones involved in growth and development in humans.



(i) Name hormones X and Y.

X _____

1

Y _____

1

(ii) Name gland Z.

1

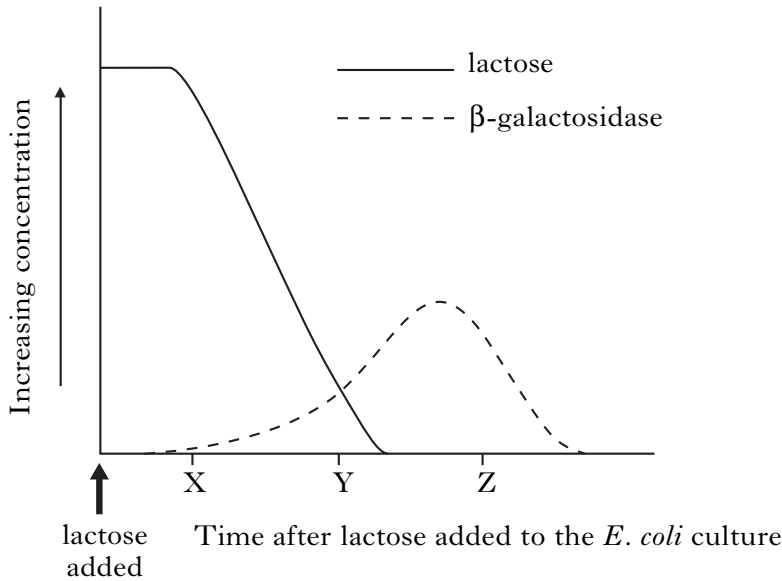
(iii) Describe the role of thyroxine in growth and development.

1

Marks

12. (a) In the control of lactose metabolism in *Escherichia coli* (*E. coli*), lactose acts as an inducer of the enzyme β -galactosidase.

The graph shows changes in concentrations of lactose and β -galactosidase after lactose was added to an *E. coli* culture growing in a container.



- (i) Describe how the graph supports the statement that β -galactosidase breaks down lactose.

1

- (ii) The statements in the table refer to times X, Y and Z on the graph. Complete the table by writing **true** or **false** in each of the spaces provided.

<i>Statement</i>	<i>True or False</i>
At time X the lactose is bound to the repressor	
At time Y the lactose is bound to the operator	
At time Z the repressor is bound to the operator	

2

Marks

12. (continued)

- (b) Complete the following sentences by underlining one of the alternatives in each pair.

Regeneration involves development of cells with specialised functions

from $\left\{ \begin{array}{l} \text{differentiated} \\ \text{undifferentiated} \end{array} \right\}$ cells through the switching on or off of

particular $\left\{ \begin{array}{l} \text{hormones} \\ \text{genes} \end{array} \right\}$.

Mammals have $\left\{ \begin{array}{l} \text{limited} \\ \text{extensive} \end{array} \right\}$ powers of regeneration.

2

[Turn over

Marks

13. The grid contains the names of substances that can influence growth and development in plants and animals.

A	calcium	B	nitrogen	C	iron	D	phosphorus
E	vitamin D	F	magnesium	G	lead	H	potassium

Use **letters from the grid** to answer the following questions.

Letters can be used once, more than once or not at all.

Each box should be completed using **one** letter only.

- (a) Complete the table below.

<i>Role in growth and development</i>	<i>Letter(s)</i>	
Important in membrane transport		
Present in chlorophyll		
Present in nucleic acids		
Needed for blood clotting		

4

- (b) Complete the sentence.

Deficiency of leads to rickets as a result of
poor absorption in the intestine.

1

Marks

14. The list below shows conditions which must be maintained within tolerable limits in the human body.

List

- A blood glucose concentration
- B blood water concentration
- C body temperature

(a) Use **all** the letters from the list to complete the table below to show where each condition is monitored.

<i>Hypothalamus</i>	<i>Pancreas</i>

1

(b) The liver contains a reservoir of stored carbohydrate.

Name **two** hormones which can cause the breakdown of this carbohydrate to increase the concentration of glucose in the blood.

1 _____

2 _____

1

(c) An increase in blood water concentration causes a reduction in the level of ADH in the bloodstream.

Describe the effect of this reduction on the kidney tubules.

1

(d) (i) When body temperature falls below normal, the blood vessels in the skin respond.

State how the blood vessels in the skin respond and explain how this helps return body temperature to normal.

Blood vessel response _____

1

Explanation _____

1

(ii) What term is used to describe animals which derive most of their body heat from their own metabolism?

1

SECTION C

Both questions in this section should be attempted.

Note that each question contains a choice.

Questions 1 and 2 should be attempted on the blank pages which follow.

Supplementary sheets, if required, may be obtained from the Invigilator.

All answers must be written clearly and legibly in ink.

Labelled diagrams may be used where appropriate.

1. Answer **either A or B**.

A. Write notes on maintaining a water balance under the following headings:

- (i) osmoregulation in **salt water** bony fish; 6
- (ii) water conservation in the desert rat. 4

(10)

OR

B. Write notes on meiosis under the following headings :

- (i) first and second meiotic divisions; 7
- (ii) its role in the production of new phenotypes. 3

(10)

In question 2, ONE mark is available for coherence and ONE mark is available for relevance.

2. Answer **either A or B**.

A. Give an account of carbon fixation in photosynthesis and its importance to plants. (10)

OR

B. Give an account of the production of new viruses after the invasion of cells and the role of lymphocytes in cellular defence. (10)

[END OF QUESTION PAPER]

SPACE FOR ANSWERS

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SPACE FOR ANSWERS

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DO NOT
WRITE IN
THIS
MARGIN

SPACE FOR ANSWERS

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SPACE FOR ANSWERS

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SPACE FOR ANSWERS

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SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 10(f)

