6069.M44C

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Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination

Biology

Sections A and B and Answerbook

Higher Level

3 hours

400 marks

Examination Number

Day and Month of Birth

For example, 3rd February is entered as 0302

Centre Stamp

Instructions

Write your Examination Number and your Day and Month of Birth in the boxes on the front cover.

Write your answers to all parts of the examination into this answerbook. This answerbook will be scanned and your work will be presented to an examiner on screen. Anything that you write outside of the answer areas may not be seen by the examiner.

Write your answers in blue or black pen. You may use pencil for sketches, graphs and diagrams only.

There are three sections in this examination. Questions for Section **C** are supplied separately but your answers must be written in this answerbook.

It is recommended that you spend not more than 30 minutes on Section **A** and 30 minutes on Section **B**, leaving 120 minutes for Section **C**.

Section **A**	Answer any **five** questions from this section. Each question carries 20 marks.
Section **B**	Answer any **two** questions from this section. Each question carries 30 marks.
Section **C**	Answer any **four** questions from this section. Each question carries 60 marks.

Section A

Answer any five questions.
Write your answers in the spaces provided.

1. Answer any **five** of the following parts (a) to (f):

(a) Name the **three** elements that are present in **all** fats (lipids).

(b) Give **one** difference between fats and oils at room temperature.

(c) A triglyceride is composed of three molecules of fatty acids attached to another molecule.
Name this other molecule.

(d) Name a test that can be used to demonstrate the presence of fat (lipid) in a food sample.

(e) Give **one** metabolic function of fats (lipids) in living organisms.

(f) Give **one** structural function of fats (lipids) in living organisms.

2. In each of the following cases, state **two** features that show how the named structure is adapted for its function.

(a) The small intestine for the absorption of food.

1.
2.

(b) Alveoli for the exchange of gases.

1.
2.

(c) An insect-pollinated flower for attracting insects.

1.
2.

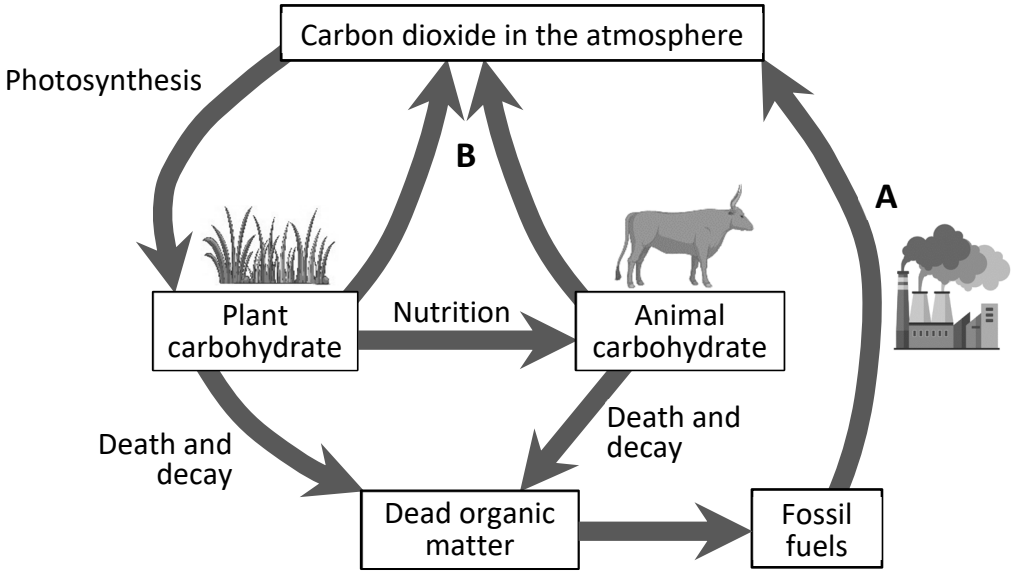
(d) A root for the uptake of water.

1.
2.

(e) The lens for focusing light onto the retina.

1.
2.

3. Ireland has agreed to reduce carbon dioxide emissions by 50% by 2030. Carbon dioxide emissions are part of the carbon cycle. The diagram shows some of the main events of the carbon cycle. Answer the questions that follow.



(a) Why is it important that carbon is recycled in nature?

(b) Name processes **A and B** in the diagram.

A.
B.

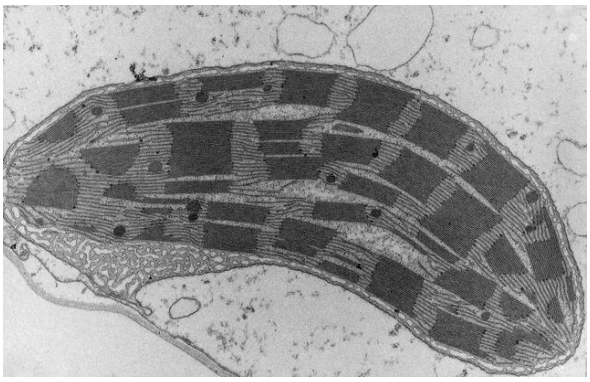
(c) State **one** way micro-organisms contribute to the carbon cycle.

(d) Suggest **two** possible ways Ireland can directly reduce carbon dioxide emissions.

1.
2.

(e) The carbon cycle is one pathway for nutrient recycling.
Name **one** other nutrient recycling pathway you have studied.

4. The image shows a plant cell organelle in which photosynthesis occurs.



(a) Name the cell organelle shown in the image.

(b) Name the green pigment required for photosynthesis.

(c) In which group of organisms would you find the organelle you named in part (a)?
Put a tick (✓) in the correct box.

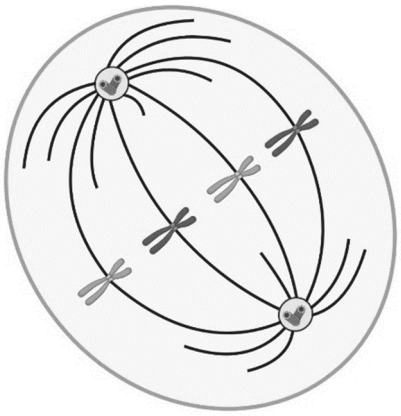
Prokaryotic ☐ Eukaryotic ☐

Give a reason for your answer.

(d) Write a balanced chemical equation for photosynthesis.

(e) Name **one** factor that affects the rate of photosynthesis.

5. The diagram shows an animal cell undergoing a stage of mitosis.
Answer the following questions in relation to mitosis.



Sketch for part (e):

(a) Which stage of mitosis is shown in the diagram?

(b) Describe **one** event that occurs during this stage.

(c) How many daughter cells will result from mitosis of this cell?

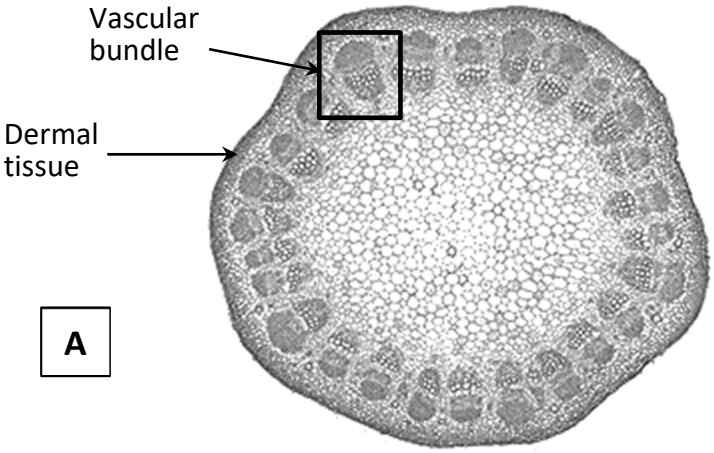
(d) What is the diploid number of the cell in the diagram?

(e) **In the box provided above**, sketch a diagram to show the next stage of mitosis.

(f) Give **one** function of mitosis in multi-cellular organisms.

(g) What term describes uncontrolled mitosis and cell division?

6. The photograph shows a transverse section of a dicotyledonous stem as seen under a light microscope.



(a) Give **one** structural feature of the stem in the photograph that identifies it as dicotyledonous.

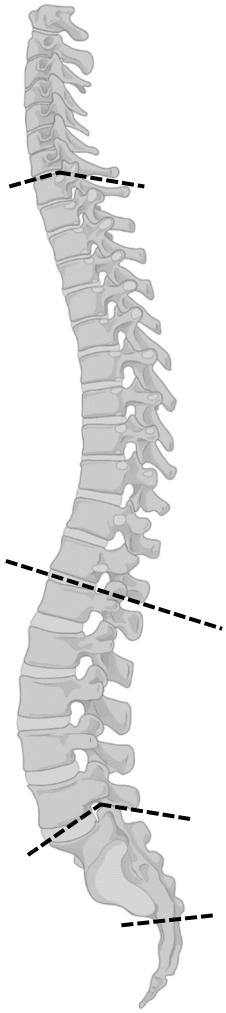
(b) **On the diagram above**, draw an arrow from the letter **A** to the ground tissue of the stem.

(c) A vascular bundle is indicated on the photograph and consists of two vascular tissues. Name these **two** vascular tissues **and** give **one** function of **each**.

1.
Function:
2.
Function:

(d) Stomata are small pores that allow gas exchange in the leaf.
Name the corresponding structures on stems.

7. The vertebral column is shown in the diagram below. It is part of the axial skeleton and is composed of five regions as indicated by the dotted lines.



(a) Name any **one** region of the vertebral column.

(b) **On the diagram**, mark the region of the vertebral column you named in part (a) above with the letter **X**.

(c) How many vertebrae are in the region you named at part (a) above?

(d) Discs of cartilage are found between the vertebrae. Give **one** function of these discs.

(e) **On the diagram** of the vertebral column, **draw an arrow** from the letter **D** to the location of **one** of the discs of cartilage.

D

(f) What type of joint is found between vertebrae?

(g) Two disorders of the musculoskeletal system include arthritis and osteoporosis.

Write one of these disorders down and give **one** cause **and one** treatment for the named disorder.

Name of disorder:
Cause:
Treatment:

Section B

Answer any two questions.
Write your answers in the spaces provided.
Part (a) carries 6 marks and part (b) carries 24 marks in each question in this section.

8. (a) Explain the terms *biotic* **and** *abiotic* as used in ecology.

Biotic:
Abiotic:

(b) The following tables compare frequency data for the plants, grass and clover, in a habitat when a herbivore (plant-eater) was present and when it was absent.

Herbivore present

	Frequency data				
Grass	✓	×	✓	×	✓
Clover	×	✓	×	✓	×

Herbivore absent

	Frequency data				
Grass	✓	✓	✓	✓	✓
Clover	×	✓	×	✓	✓

(i) Describe how the frequency data would have been obtained.

(ii) Calculate the percentage frequency for both grass **and** clover when the herbivore was present.

Grass:	Clover:

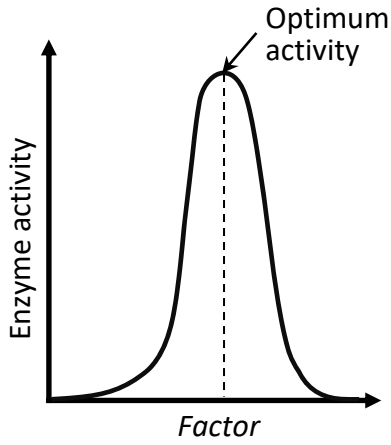
(iii) Suggest **one** possible conclusion that can be made from the data.

(iv) Suggest **one** possible source of error in this investigation **and** how this source of error may be minimised.

Source of error:
How minimised:

9. (a) (i) Name **one** factor, other than temperature, that affects the rate of activity of an enzyme.

(ii) Explain the term *optimum activity* in relation to enzymes.



(b) As part of your study of enzymes, you conducted an activity to investigate the effect of heat denaturation on the activity of one enzyme. Answer the following questions in relation to this investigation.

(i) Name the enzyme you used **and** its substrate(s) **and** product(s).

Enzyme:
Substrate(s):
Product(s):

(ii) Describe how you carried out the investigation.
Use a suitably labelled diagram, if necessary.

(iii) Describe the results of this investigation.

10. (a) Give **two** factors, other than exercise, that have an effect on the circulatory system.

1.
2.

(b) A student investigated the effect of two minutes of two types of exercise on pulse rate (PR) and breathing rate (BR). She repeated the investigation three times and calculated average data for PR and BR. Answer the following questions.

(i) Describe how the student measured resting PR **or** resting BR.

(ii) The student's results are shown in the table below.

	PR	BR
Resting	62	16
Moderate exercise	118	25
Intense exercise	150	45

In the space provided, draw (using pencil) a suitable graph to represent the data of **either** pulse rate (PR) **or** breathing rate (BR).

(iii) State what would happen to the PR **or** BR after exercise has stopped.

(iv) Suggest a reason for the student repeating the investigation three times.

(v) During this activity, body temperature also increased. Suggest a reason for this.

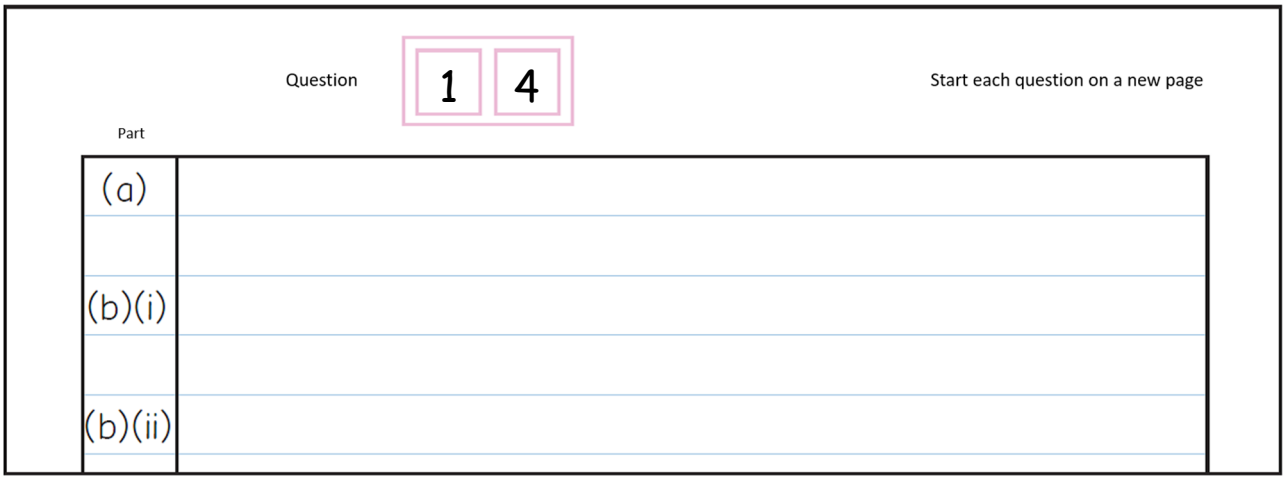
(vi) Describe a safety precaution the student would have taken in carrying out this investigation.

Answerbook for Section C

Instructions

Questions for Section **C** are supplied separately.

Start each question on a new page. Write the question number in the box at the top of each page. Use the left-hand column to label each part, as shown below.



There are two pages of graph paper on the next two pages of this answerbook. On pages with graph paper, the box for the question number is at the bottom of the page.

You do not need to use all of the pages in this answerbook. If you run out of space in this answerbook, you may ask the superintendent for more paper or graph paper.

Write your answers in blue or black pen. You may use pencil for sketches, graphs and diagrams only.

Question

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Leaving Certificate – Higher Level

Biology - Sections A and B and Answerbook

3 hours