2023L025G1EL



2023.M43

Coimisiún na Scrúduithe Stáit State Examinations Commission

Leaving Certificate Examination 2023 Biology

Sections A and B and Answerbook Ordinary Level

Tuesday 13 June Afternoon 2:00 - 5:00
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.	Ansv	Answer the following parts (a) to (e):						
	(a)	Give one source of carbohydrate in the diet.						
	(b)	Name one element found in carbohydrates.						
	(c)	Give one structural role of carbohydrates in living organisms.						
	(d)	Two monosaccharides can join together to form a						
	(e)	Name a polysaccharide found in plants.						

appropriate box in each case. The first one has been completed as a							
Exan	nple:		True	False			
Biology is the study of life						\checkmark	
(a) A hypothesis is a possible explanation for an observation.					ation.		
(b) A good experiment requires a small sample size.							
(c)	Data alway	s involves nu	mbers.				
(d)	Safety is ar	n important p	rinciple of expe	erimentation.			
(e)	Random se	election is an	important princ	ciple of exper	imentation.		
(f)	The scienti	fic method h	as limitations.				
(g)	A theory is	an unsuppor	g) A theory is an unsupported hypothesis.				
Colur	mn A. The f	irst one has b	ollowing list and been completed	as an examp			·
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Colur	mn A. The f Irochloric acid	irst one has b Villi Column A	ollowing list and been completed Liver	as an examp	Egestion Column	Pe ı B	·
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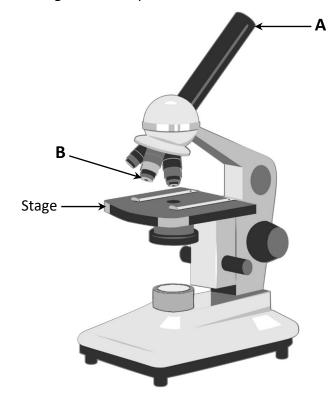
Indicate whether the following statements are true or false by placing a tick (\checkmark) in the

2.

	mary of aerobic respiration. Glucose + X → Y + Water	
(a)	Identify gases X and Y .	
	X:	
	Y:	
(b)	Aerobic respiration consists of two stages (1 and 2). Descent the two stages in terms of the amount of energy released	
(b)	Aerobic respiration consists of two stages (1 and 2). Desc	
(b)	Aerobic respiration consists of two stages (1 and 2). Descent the two stages in terms of the amount of energy released Stage 1:	d.

Name the product formed in the athlete's muscles as a result of anaerobic respiration.

5. The diagram shows a light microscope.



(a) Names the parts of the microscope labelled **A** and **B**.

A:			
В:			

- (b) Using the letter 'X', indicate on the diagram above the source of light.
- (c) What is the function of the stage on the microscope?

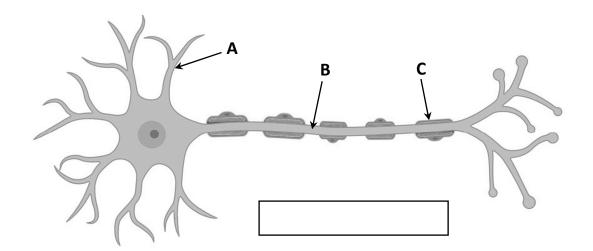
If the magnification of lone A is v10 and the magnification of lo	ns Ris v/O what is the

- (d) If the magnification of lens **A** is x10 and the magnification of lens **B** is x40, what is the total magnification?
- (e) What is the function of a stain when using the light microscope?

(f) The light microscope is one type of microscope. Name another type of microscope.

6.		diagram represents a part of a DNA molecule. Inplete the following in relation to DNA.					
	(a)	How many strands make up a DNA molecule?					
	(b)	Name any two nitrogenous bases found in DNA.					
		1.					
		2.	Nitrogenous base pairs				
	(c)	Three bases together are known as a					
	(d)	Where in the human cell would you expect to find r	most DNA?				
	(e)	DNA contains the instructions needed to make prot	ein. This is called the code.				
	(f)	Name a complementary structure to DNA that is involved in protein synthesis.					

7. The diagram shows a neuron (nerve cell).



(a) Name the parts labelled A, B and C.

A:
B:
C:

(b) Give the function of the part labelled A.

- (c) In the box on the diagram above, draw an arrow showing the direction the nerve impulse will travel in this neuron.
- (d) Name the chemicals used to transmit nerve impulses from one neuron to another.

(e) Name any **one** disorder of the nervous system.

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.

	Flo	ora:										
		una:										
(b)												
		table show ey (percent			_				Presence (✓) absence (×)			
		s in a habita w based or			estions th	at	Dandeli	on 🗸	x	✓	×	✓
	(i)	Describe l		survey m	ay have be	een	Grass	~		✓	✓	✓
	(ii)		the perce	entage fre	equency o	f dandel	lion and gr	rass in	this h	abita	t.	
	Da	ndelion:	the perce	entage fre	equency o	f dandel	lion and gr	rass in	this h	abita	t.	
	Da		the perce	entage fre	equency o	f dandel	lion and gr	rass in	this h	abita	t.	
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9.	(a)	Wha	at is meant by the term <i>osmosis</i> ?
	(b)	(i)	Draw a labelled diagram of the apparatus that you used to demonstrate osmosis.
		(ii)	Describe how you carried out the experiment to demonstrate osmosis.
		(iii)	How were you able to tell that osmosis had taken place?

10.	(a)	It is important to use sterile apparatus when working with micro-organisms.								
		(i)	What is meant by the term	sterile?						
		(ii)	Give one method of sterilis	ing apparatus.						
	(b)	The following data table shows the difference in the growth of leaf yeast (number of colonies in malt agar) in the months of May and September.								
				May	September					
			Number of colonies	5	14					
		(i)	Name a suitable plant from investigation.	n which leaves car	n be obtained to carry out this	S				
		(ii)	Name a suitable container	that can be used	to grow leaf yeast.					
		(iii)	Suggest a reason for the pr	uggest a reason for the presence of malt in the agar.						
		(iv)	Describe how leaf yeast co	uld be introduced	into the malt agar.					
		(v)	Describe a suitable control	for this investigat	tion.					
		(vi)	What colour are leaf yeast	colonies on malt	agar?					
		(vii)	Suggest a reason for the loobtained from a plant in M		af yeast colonies present on l ber.	eaves				

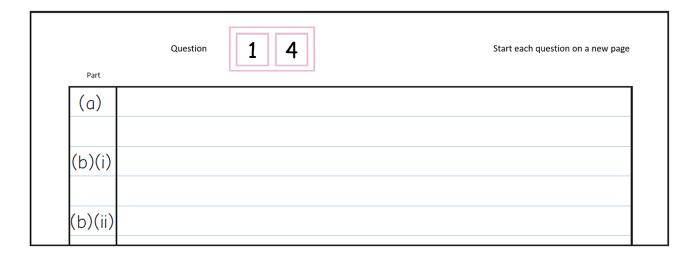
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Answerbook for Section C

Instructions

Questions for Section C are supplied separately.

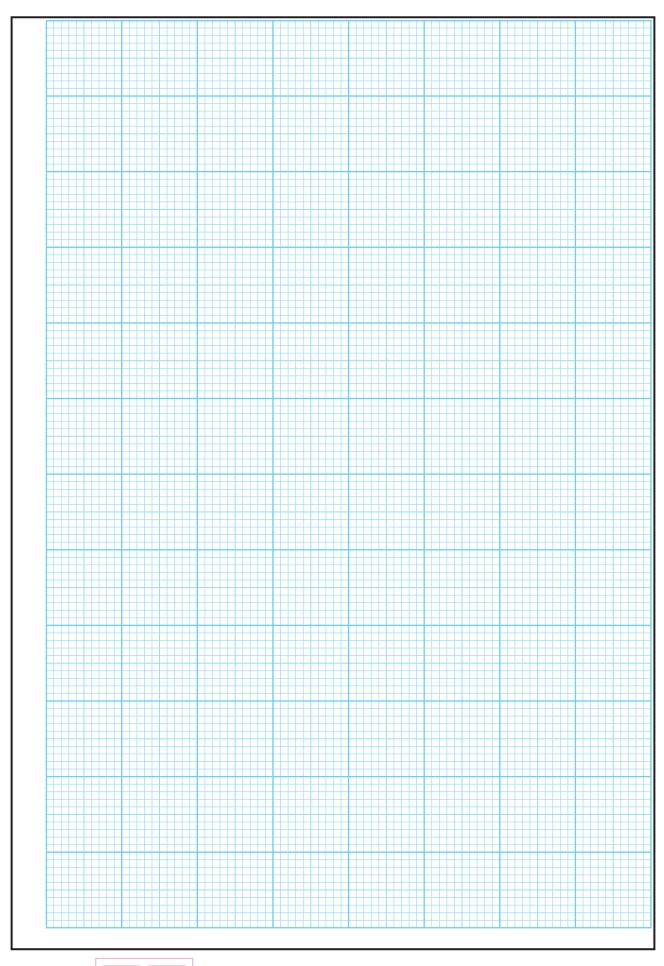
Start each question on a new page. Write the question number in the box at the top of each page. Use the left-hand column to label each part, as shown below.



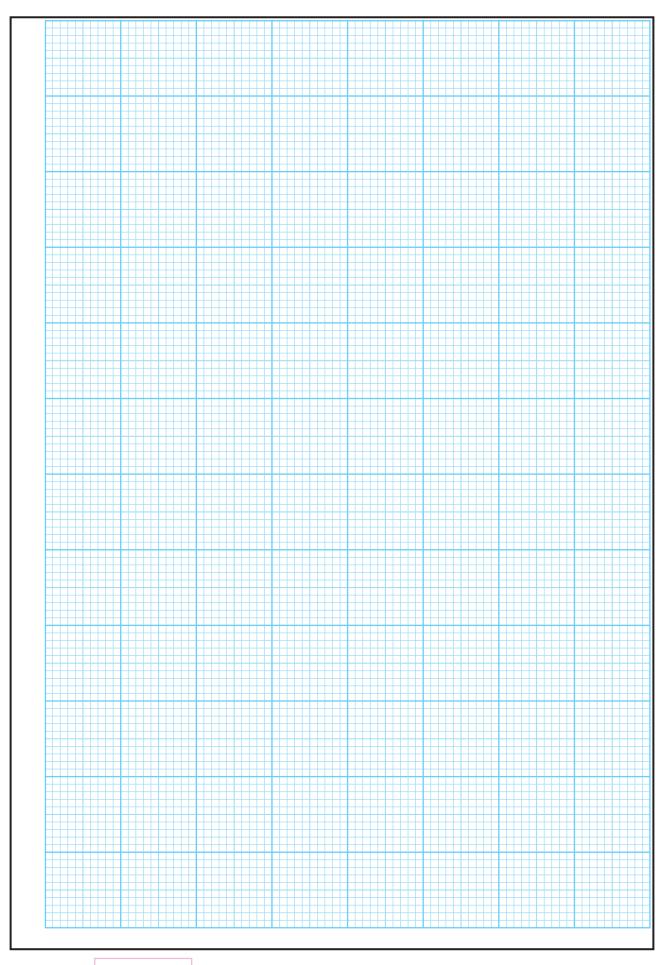
There are two pages of graph paper on the next two pages of this answerbook. On pages with graph paper, the box for the question number is at the bottom of the page.

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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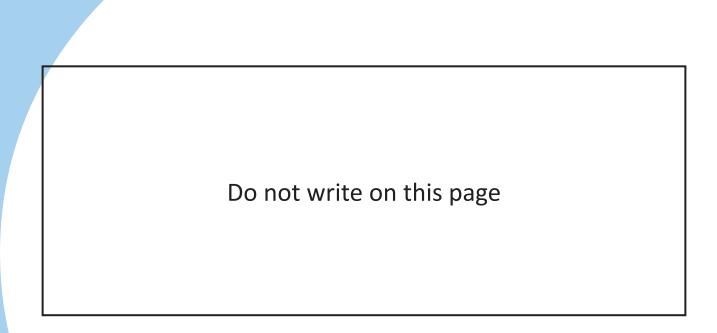
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Leaving Certificate - Ordinary Level

Biology Sections A and B and Answerbook

Tuesday 13 June

Afternoon 2:00 - 5:00

2023.M43 2023L025G2EL



Coimisiún na Scrúduithe Stáit State Examinations Commission

Leaving Certificate Examination 2023 Biology Section C

Ordinary Level

Tuesday 13 June Afternoon 2:00 - 5:00

240 marks

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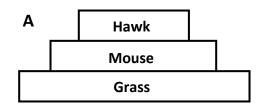
State Examinations Commission.

Section C

Answer any four questions.

Write your answers in the answerbook containing Sections A and B.

- **11.** (a) (i) What is meant by the term *pollution*?
 - (ii) Describe **one** human activity that may cause pollution **and** suggest **one** way in which this pollution could be controlled. (9)
 - (b) Answer the following questions in relation to ecological pyramids.





- (i) Match pyramids **A** and **B** above with a possible correct ecosystem from the following list: rocky seashore; grassland; woodland; marine.
- (ii) Name the producer in pyramid A.
- (iii) Name a source of energy for a producer.
- (iv) Name the primary consumer in pyramid B.
- (v) What information do ecological pyramids provide us with?
- (vi) Suggest what might happen if the bladderwrack was removed from the habitat represented in pyramid **B**.
- (vii) Suggest what might happen if the top consumer in pyramid **A** died off due to disease.
- (viii) How might you identify the animals and plants listed in the pyramids? (27)
- (c) Read the passage below and answer the questions that follow.

Essential nutrients, such as nitrogen and potassium compounds, can be stored in the soil and made available when crops need them. The ability to supply these nutrients to plants relies on a number of soil properties, e.g. pH, temperature and moisture content of the soil.

Moist soil allows chemical reactions to work better and allows nutrients to diffuse more easily into the plant roots. Organic matter, clay type, particle size and the presence of micro-organisms and other decomposers, such as worms, are also important for healthy soils.

Adapted from "The dark mysteries of the soil beneath our feet", www.rte.ie, 17th September 2021.

- (i) What ecological term describes soil factors?
- (ii) Name any **two** essential nutrients present in healthy soil.
- (iii) Name any **two** soil factors that can have an effect on living organisms present in the soil.
- (iv) Give **one** biotic factor mentioned in the article.
- (v) Suggest a possible source of nitrogen compounds in the soil.
- (vi) Decomposers are important in recycling nutrients. Give a reason why it is important for nutrients to be recycled.(24)

- **12.** (a) (i) Name the **two** biochemicals that make up chromosomes.
 - (ii) How many chromosomes are in a diploid human cell?
 - (b) In humans, the <u>allele</u> for brown eyes (**B**) is <u>dominant</u> to the allele for blue eyes (**b**).

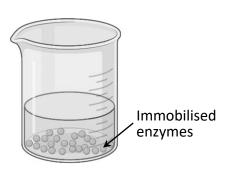
(9)



- Explain the underlined terms.
- (ii) Jack's genotype is **Bb**. What colour are Jack's eyes?
- (iii) Which of the following terms describes Jack's genotype? homozygous; heterozygous.
- (iv) Sarah has blue eyes. Write out Sarah's genotype for eye colour.
- (v) Give the genotypes of the **two** possible gametes that Jack can produce.
- (vi) If Sarah and Jack were to have children, write out the two phenotypes of their possible offspring.(27)
- (c) Tissue culture is an important biological technique where cells divide rapidly in a nutrient medium.
 - (i) Distinguish between a tissue **and** an organ by writing a brief sentence on **each**.
 - (ii) Name **two** types of tissue found in animals.
 - (iii) Suggest **one** reason why sterile conditions are necessary in tissue culture.
 - (iv) Name the type of cell division that occurs in tissue culture where genetically identical cells are grown.
 - (v) How many cells result from one cell undergoing the type of cell division you named at part (c) (iv) above?
 - (vi) Give **one** application of tissue culture. (24)

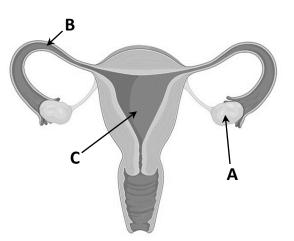
(i)

- **13.** (a) Photosynthesis is an important metabolic reaction in biology.
 - (i) Name a pigment essential for photosynthesis.
 - (ii) Where in a plant cell can the pigment you named in part (a) (i) above be found?
 - (iii) This pigment is involved in trapping energy.Give one source of this energy.(9)
 - (b) The diagram shows a cross section of the internal structure of a leaf. The reactions of photosynthesis occur within the cells of the leaf.
 - (i) Water is split into three products during photosynthesis. Name the three products.
 - (ii) Where does the plant obtain the water required for photosynthesis?
 - (iii) Suggest a reason for the leaf being very thin.
 - (iv) Gas X is required for photosynthesis and can come from the atmosphere or the cells of the leaf.Name gas X.
 - (v) What is the main product of photosynthesis?
 - (vi) Using your knowledge of photosynthesis, describe two methods horticulturists can use to improve crop growth in greenhouses.(27)
 - (c) (i) Chemicals called <u>enzymes</u> are involved in <u>metabolism</u> within cells. Explain the underlined terms.
 - (ii) Where in a cell are enzymes produced?
 - (iii) Name **two** factors that can affect enzyme action.
 - (iv) The diagram shows immobilised enzymes. What is meant by the immobilisation of an enzyme?
 - (v) Give two advantages of bioprocessing using immobilised enzymes.



(24)

- **14.** (a) Oestrogen is one of the female reproductive hormones.
 - (i) State **one** function of oestrogen.
 - (ii) Name **one** other female reproductive hormone **and** state its function.
 - (b) The diagram shows the reproductive system of a human female.
 - (i) Name the parts labelled A, B, and C.
 - (ii) In which labelled part is the ovum (egg) formed?
 - (iii) What type of cell division is involved in the production of the ovum (egg)?
 - (iv) State **one** way in which the ovum (egg) differs from a sperm cell.
 - (v) Explain the term fertilisation.
 - (vi) State the location from the diagram above where each of the following occurs:
 - 1. Fertilisation
 - 2. Implantation



- (c) Answer the following questions in relation to pregnancy and birth.
 - (i) The placenta is a very important organ in pregnancy.Give any one function of the placenta.
 - (ii) Describe the main events of the birth process in humans.
 - (iii) Describe any two biological benefits of breastfeeding.
 - (iv) Name **two** methods of contraception.

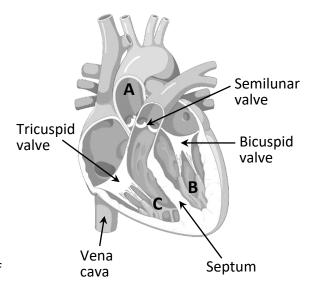


(24)

(27)

(9)

- **15.** (a) (i) Give **two** differences between an artery and a vein.
 - (ii) Name the small blood vessels that are responsible for exchange of substances with body cells. (9)
 - (b) The following questions relate to the human breathing system.
 - (i) Where in the body are the lungs located?
 - (ii) What is the function of the rings of cartilage found in the trachea?
 - (iii) Give the function of the alveoli in the lungs **and** give **one** feature of an alveolus that enables it to carry out this role.
 - (iv) Describe the role of each of the following during inhalation:
 - 1. Diaphragm
 - 2. Intercostal muscles
 - 3. Brain
 - (v) Name **one** breathing disorder **and** give a possible cause. (27)
 - (c) The diagram shows a section through a human heart.
 - (i) Name the blood vessel labelled A.
 - (ii) Give one reason why the wall of chamber B is thicker than the wall of chamber C.
 - (iii) What is the role of the bicuspid valve?
 - (iv) Which part of the heart prevents oxygenated blood mixing with deoxygenated blood?
 - (v) 1. Name the artery through which the heart muscle itself receives blood.



- 2. Suggest what might happen if this artery became blocked.
- (vi) Give **one** factor that can cause an increase in heart rate.
- (vii) State **one** feature of the diet that can harm the circulatory system. (24)

- (a) The diagram shows a section through a human kidney, an organ responsible for excretion.
 - (i) Explain in detail the term excretion.
 - (ii) Match the parts labelled **D**, **E** and **F** with the following terms:

medulla; renal pelvis; cortex

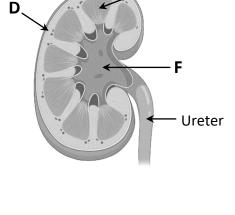
- (iii) The ureter connects the kidney to another part of the urinary system.Name this other part.
- (iv) The kidneys are surrounded by a thick layer of fat.Give one function of this layer of fat.
- (v) Filtration, reabsorption and secretion are essential processes in the formation of urine.

Give the location in the kidney for each of the following:

- 1. Filtration
- 2. Reabsorption
- (vi) Name an excretory organ in the human body, other than the kidney.
- (b) The diagram shows a section through the human eye.
 - (i) Match the parts labelledX, Y and Z with the following terms:

lens; iris; cornea

- (ii) What is the function of the part labelled **Y**?
- (iii) Which labelled part focuses the light rays?
- (iv) Where are light rays usually focused?
- (v) The diameter (d) of the pupil changes depending on light levels.What would you expect to happen to the diameter of the pupil in bright light?
- (vi) The optic nerve carries impulses.
 To which organ do these impulses travel?
- (vii) Name a disorder of the eye **or** the ear **and** give a corrective measure.

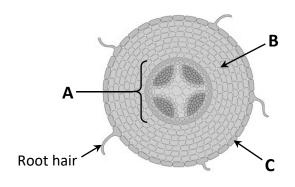


Retina

Optic

nerve

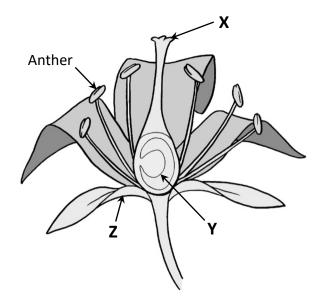
- (c) The diagram shows a transverse section through part of a root.
 - (i) Match the plant tissues labelledA, B and C with the following terms:ground; vascular; dermal
 - (ii) Give **two** substances that are transported by the tissue labelled **A**.



- (iii) Name a type of cell located in the tissue labelled A.
- (iv) What is the function of the root hair?
- (v) Name any **two** ways in which a section through the stem would differ from the section shown in the diagram above.
- (vi) What term describes a root's growth in response to gravity?
- (d) The diagram shows the structure of an animal-pollinated flower.
 - (i) Match the parts labelled X, Y and Z with the following terms:

ovule; sepal; stigma

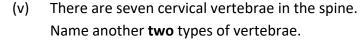
- (ii) What is the function of the part labelled **Z**?
- (iii) Pollen is produced by the anther. On which labelled part are pollen grains received?
- (iv) Give one possible adaptation of this flower that shows it is animal-pollinated.



- (v) Give **one** feature of a wind-pollinated flower.
- (vi) In which labelled part does the seed develop?
- (vii) Fruit formation follows seed formation.Give one function of the fruit of a plant.
- (viii) Dormancy is a period during which the seed of a plant is not growing. Give **one** reason why dormancy is of benefit to a plant.

- (a) Answer the following questions based on the human skeletal system.
 - (i) Give **two** functions of the human skeleton.
 - (ii) Give **one** location in the human body where a hinge joint is found.
 - (iii) Name one other type of synovial joint.
 - (iv) The diagram shows a typical synovial joint.
 Match the parts labelled **D**, **E** and **F** with the following terms:

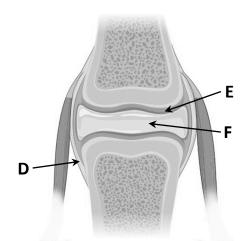
synovial fluid; cartilage; ligament



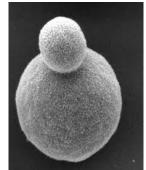
- (vi) Name one disorder of the musculoskeletal system.
- (b) Answer the following questions based on the human endocrine system.
 - (i) Explain in detail the term *hormone*.
 - (ii) Copy the table below into your answerbook and complete it. Some boxes have been filled in as examples.

Name of gland	Hormone	Function of hormone
	Thyroxine	
	Adrenaline	To prepare the body for "fight or flight"
Testes		

- (iii) State **two** ways in which hormone action differs from nerve action.
- (iv) Give **one** example of the use of hormone supplements.



- (c) (i) To which kingdom does Rhizopus belong?
 - (ii) Draw a labelled diagram of Rhizopus.
 - (iii) Name **one** food on which *Rhizopus* commonly grows.
 - (iv) In terms of nutrition, is *Rhizopus* a parasite or a saprophyte? Explain your answer.
 - (v) Rhizopus can undergo both sexual and asexual reproduction.Describe asexual reproduction in Rhizopus.
 - (vi) Yeast belong to the same kingdom as Rhizopus. The diagram shows a yeast cell undergoing asexual reproduction. What term describes asexual reproduction in yeast?



- (d) (i) To which kingdom do bacteria belong?
 - (ii) What shape of bacterium is shown?
 - (iii) Name the method by which bacteria reproduce.
 - (iv) In terms of nutrition, bacteria can be either <u>autotrophic</u> or <u>heterotrophic</u>. Explain the underlined terms.



- (v) Give **one** example of how bacteria can be useful to humans.
- (vi) 1. What are pathogenic bacteria?
 - 2. Give **one** example of a pathogenic bacterium.
- (vii) 1. What are antibiotics?
 - 2. Give **one** reason why is it important that antibiotics are not misused.

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Leaving Certificate - Ordinary Level

Biology

Tuesday 13 June

Afternoon 2:00 - 5:00