Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2024

Marking Scheme

Biology

Ordinary Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Introduction

The marking scheme is a guide to awarding marks to candidates' answers. It is a concise and summarised guide and is constructed so as to minimise its word content. Examiners must conform to this scheme and may not allow marks for answering outside this scheme. The scheme contains key words, terms and phrases for which candidates may be awarded marks. This does not preclude synonyms or terms or phrases which convey the same meaning as the answer in the marking scheme. Although synonyms are generally acceptable, there may be instances where the scheme demands an exact scientific term or unequivocal response and will not accept alternatives. The descriptions, methods and definitions in the scheme are not exhaustive and alternative valid answers are acceptable. If it comes to the attention of an examiner that a candidate has presented a valid answer and there is no provision in the scheme for accepting this answer, then the examiner must first consult with his/ her advising examiner before awarding marks. As a general rule, if in doubt about any answer, examiners should consult their advising examiner before awarding marks.

How to use the marking scheme

- Where only one answer is required alternative answers are separated by '**or**'.
- Where multiple answers are required each word, term or phrase for which marks are allocated is separated by a solidus (/) from the next word, term or phrase.
- The mark awarded for an answer appears in **bold** next to the answer, e.g. **3**.
- Where there are several parts in the answer to a question, the mark awarded for each part appears in brackets, e.g. **5(4)** means that there are five parts to the answer, each part allocated **4 marks**.
- The answers to subsections of a question may not necessarily be allocated a specific mark, e.g. there may be six parts to a question – (a), (b), (c), (d), (e), (f) and a total of **20 marks** allocated to the question. The marking scheme might be as follows, **2(4) + 4(3)**. This means that the first two correct answers encountered are awarded **4 marks** each and each subsequent correct answer is awarded **3 marks**.
- A word or term that appears in brackets ( ) is not a requirement of the answer, but is used to contextualise the answer or may be an alternative valid answer.

Some examples of the marking process

1. **Key words or terms or phrases may be awarded marks, only if presented in the correct context.**

   Sample question: *Outline how you quantified a named animal in your habitat study.*

   Marking scheme states: Named animal / captured / method of capture / counted / released / recaptured / data recorded / calculation described

   Any four **4(3)**

   Sample answer: *I captured hares using a pooter and counted them.*

   Although the candidate has named an animal, mentioned that it was captured, and how they caught it, the method of capture is not correct with regard to the animal. The candidate's answer can only be awarded **3(3)**.

2. **Cancelled Answers**

   The following is an extract from **S.63o** *Instructions to Examiners, 2024 (for subjects being marked online)* (section 5.4, p.19):

   > "*Where a candidate answers a question or part of a question once only and then cancels the answer, you should ignore the cancelling and treat the answer as if the candidate had not cancelled it.*"

   Sample question: *What is pollination?*

   Marking scheme states: Transfer of pollen / from anther / to stigma. **3(3)**

   Sample answer: ~~*Transfer of pollen by insect to stigma.*~~

   The candidate has cancelled the answer and has not made another attempt to answer the question. The candidate may be awarded **2(3)** marks.

   If an answer is cancelled and an alternative version given, the cancellation should be accepted and marks awarded, where merited, for the un-cancelled version only.

   If two (or more) un-cancelled versions of an answer are given to the same question or part of a question, both (or all) should be marked and the answer accepted that yields the greater (greatest) number of marks. Points may not, however, be combined from multiple versions to arrive at a manufactured total.

3. **Surplus Answers: [only in Section A] - A surplus wrong answer cancels the marks awarded for a correct answer.**

   (i) **Sample question 1**: *The walls of xylem vessels are reinforced with…….*

   Marking scheme states: Lignin **4 marks**

   Sample answer: *Chitin, lignin*

   There is a surplus incorrect answer, therefore the candidate scores **4 – 4 = 0 marks**.

Sample answer: ~~*Lignin*~~

The answer, which is correct, has been cancelled by the candidate, but there is no additional or surplus answer, therefore the candidate may be awarded **4 marks**.

Sample answer: *Lignin,* ~~*chitin*~~

There is a surplus answer, which is incorrect, but it has been cancelled and as the candidate has given more than one answer (i.e. the candidate is answering the question more than once only), the cancelling can be accepted and s/he may be awarded **4 marks**.

(ii) **Sample question 2**: *Name the four elements that are always present in protein.*

Marking scheme states: Carbon / hydrogen / oxygen / nitrogen **4(3)**

Sample answer: *Carbon, hydrogen, oxygen, nitrogen, calcium*

There is a surplus answer, which is incorrect, which cancels one of the correct answers, therefore the candidate is awarded **3(3)** marks.

Sample answer: *Carbon, hydrogen, oxygen, calcium*

There is no surplus answer – there are three correct answers, and therefore the candidate is awarded **3(3)** marks.

Sample answer: *Carbon, hydrogen, oxygen, calcium, aluminium*

There is a surplus answer, which is incorrect, and cancels one of the three correct answers, therefore the candidate is awarded **2(3)** marks.

Sample answer: *Carbon, hydrogen, oxygen, calcium,* ~~*aluminium*~~

There is a surplus answer, which is incorrect, but it has been cancelled so the candidate may be awarded **3(3)** marks.

In the other sections of the paper (Sections B and C), there may be instances where a correct answer is nullified by the addition of an incorrect answer. This happens when the only acceptable answer is a specific word or term. Each such instance is indicated in the scheme by an asterisk *.

Annotations used in the marking

The scripts were marked by examiners using an online marking platform. The following table illustrates the various annotations (symbols) applied by the examiners when marking the scripts. The meaning and use of each of the annotations applied are also explained in the table. These annotations will be seen on a script if viewed as part of the appeal process. Annotations applied by an examiner will be viewed in red. Scripts that were also marked by an advising examiner will show annotations in a green colour.

Annotation	Meaning
	This symbol indicates a correct response/ answer.
	This symbol indicates an incorrect response/answer.
	This symbol is placed on all blank pages or part of page to indicate it has been seen by the examiner.
	This symbol can be used by an examiner to indicate a part of a question answer of significance.
	Surplus incorrect answer. A surplus incorrect answer has cancelled a correct answer.

Bonus marks for answering through the medium of Irish

Bonus marks at the rate of 10% of the marks obtained will be given to a candidate who answers entirely through Irish and who obtains 75% or less of the total mark available in (i.e. 300 marks or less). In calculating the bonus to be applied, decimals are always rounded down, not up ¬ e.g., 4.5 becomes 4; 4.9 becomes 4, etc. See below for when a candidate is awarded more than 300 marks.

Marcanna Breise as ucht freagairt trí Ghaeilge

Léiríonn an tábla thíos an méid marcanna breise ba chóir a bhronnadh ar iarrthóirí a ghnóthaíonn níos mó ná 75% d'iomlán na marcanna.

N.B. Ba chóir marcanna de réir an ghnáthráta a bhronnadh ar iarrthóirí nach ngnóthaíonn níos mó ná 75% d'iomlán na marcanna don scrúdú. Ba chóir freisin an marc bónais sin **a shlánú síos**.

Tábla 400 @ 10%

Bain úsáid as an tábla seo i gcás na n-ábhar a bhfuil 400 marc san iomlán ag gabháil leo agus inarb é 10% gnáthráta an bhónais.

Bain úsáid as an ngnáthráta i gcás 300 marc agus faoina bhun sin. Os cionn an mharc sin, féach an tábla thíos.

Bunmharc	Marc Bónais
301 - 303	29
304 - 306	28
307 - 310	27
311 - 313	26
314 - 316	25
317 - 320	24
321 - 323	23
324 - 326	22
327 - 330	21
331 - 333	20
334 - 336	19
337 - 340	18
341 - 343	17
344 - 346	16
347 - 350	15

Bunmharc	Marc Bónais
351 - 353	14
354 - 356	13
357 - 360	12
361 - 363	11
364 - 366	10
367 - 370	9
371 - 373	8
374 - 376	7
377 - 380	6
381 - 383	5
384 - 386	4
387 - 390	3
391 - 393	2
394 - 396	1
397 - 400	0

Section A	**Best 5**	**100**

Question 1 **20**

5(4)

(a) Why is food required by **all** living organisms?

Energy or growth or repair **4**

(b) Name the **other** element.

Nitrogen (or N) **4**

(c) Give **one** source of protein in the diet.

Correct source named **4**

(d) Which of the following is a structural role of protein in living organisms?

Component of hair and nails **4**

(e) Which of the following is the smallest unit of a protein?

Amino acid **4**

Q1 (a) – (e)	**Number of correct responses**	1	2	3	4	5
	Mark	4	8	12	16	20

Question 2 **20**

6(3) + 2

(a) Is yeast a unicellular or multicellular organism?

Unicellular

(b) What is the reason for budding in yeast?

Reproduction

(c) Which part of the yeast cell (**X** or **Y**) is the bud?

X

(d) Briefly describe what happens to the bud.

Remains attached **or** detaches from parent cell

(e) What is the name of the organelle labelled **Z**?

Nucleus

(f) **On the diagram above**, draw an arrow from the label '**Cell wall**' to the location of the cell wall in the yeast cell.

Label correctly pointing at cell wall

(g) Yeast is a member of which kingdom?

Fungi

Q2 (a) – (g)	**Number of correct responses**	1	2	3	4	5	6	7
	Mark	3	6	9	12	15	18	20

Question 3		20
(a)	Name structure **A**.	
	Chromosome	**3**
(b)	Name structure **B**.	
	(Spindle) fibre	**3**
(c)	Briefly describe what is happening during **Stage 2** of mitosis.	
	(Duplicated chromosomes) line up on the equator of the cell	**4**
(d)	Briefly describe what is happening during **Stage 3** of mitosis.	
	(Chromosomes) are pulled to the ends of the cell or (duplicated chromosomes) separate	**4**
(e)	How many daughter cells result from mitosis?	
	2	**3**
(f)	What is the function of mitosis in multicellular organisms?	
	Growth	**3**

Question 4		20
	5(4)	
(a)	Name the **two** main components (**A** and **B**) of a virus.	
	A: Protein (or capsid)	**4**
	B: Nucleic acid (or DNA or RNA)	**4**
(b)	Give **one** examples of harmful virus.	
	One harmful virus named	**4**
(c)	Give an example of how viruses might be beneficial.	
	Used in genetic engineering **or** used in cancer research **or** other correct	**4**
(d)	Which of the following sentences describe how viruses replicate?	
	Viruses replicate within living cells.	**4**

Q4 (a) – (d)	**Number of correct responses**	1	2	3	4	5
	Mark	4	8	12	16	20

Question 5 **20**

6(3) + 2

(a) Give **two** functions of the skeleton.

Structure / support / movement / blood cell production / protection / other correct

Any two

(b) Name the bones labelled **A**, **B** and **C**?

A: Skull or cranium

B: Rib

C: Pelvis

(c) Which of the following types of joint is located between the bones of part **A**?

Immovable

(d) Which of the following types of joints describes a hinge or ball and socket joint?

Free-moving or synovial

Q5 (a) – (d)	**Number of correct responses**	1	2	3	4	5	6	7
	Mark	3	6	9	12	15	18	20

Question 6 **20**

6(3) + 2

Indicate whether the statements are true or false:		True	False
(a)	The stage of a light microscope holds the slide.	☑	☐
(b)	Protein synthesis occurs on the ribosome.	☑	☐
(c)	Animal cells have cell walls.	☐	☑
(d)	A tissue is a group of organs.	☐	☑
(e)	Immobilised enzymes can be reused.	☑	☐
(f)	Osmosis is a special case of diffusion.	☑	☐
(g)	Cell membranes are fully permeable.	☐	☑

Q6 (a) – (g)	**Number of correct responses**	1	2	3	4	5	6	7
	Mark	3	6	9	12	15	18	20

Question 7	**20**

5(4)

Choose **each** term from the following list and place it in Column B to match a description in Column A. The first one has been completed as an example.

~~Safety~~ **Hypothesis** **Data** **Control** **Theory** **Experiment**

	Column A	***Column B***
	Principle of experimentation	**Safety**
(a)	Possible explanation for an observation	Hypothesis
(b)	Used to test a hypothesis	Experiment
(c)	Comparison to a test	Control
(d)	Information and measurements collected during an investigation	Data
(e)	Supported hypothesis	Theory

Q7 (a) – (e)	**Number of correct responses**	1	2	3	4	5
	Mark	4	8	12	16	20

Section B	**Best 2**	**60**

Question 8 **30**

2(3)

(a) (i) Define the term *habitat*.

Place where an organism lives **3**

(ii) What did you use to identify fauna and flora in your habitat study?

Key **or** other correct **3**

Q8 (a) (i) – (ii)	**Number of correct responses**	1	2
	Mark	3	6

8(3)

(b) (i) Name the **three** abiotic factors you studied **and** briefly state how you measured **each** of them; e.g. state the apparatus you may have used.

(Soil or water) pH
pH meter
/
(Soil or water) temperature
Thermometer
/
Wind speed
Anemometer
/
Correct abiotic factor
Matching way abiotic factor is measured **Any three** **6(3)**

(ii) Name **two** pieces of collection apparatus **or** name **two** methods you used to collect organisms as part of your habitat study.

Pooter / pitfall trap / cryptozoic trap / direct search / beating tray / net / Tullgren funnel / other correct **Any two** **2(3)**

Q8 (b) (i) – (ii)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 9 **30**

2(3)

(a) (i) Define the term *enzyme*.

(Protein) catalyst **3**

(ii) Name a factor, other than temperature, that affects enzyme activity.

pH **or** other correct **3**

Q9 (a) (i) – (ii)	**Number of correct responses**	1	2
	Mark	3	6

8(3)

(b) (i) Write down the enzyme you used from the list below **and** give the substrate of this enzyme.

Enzyme: Named enzyme (amylase **or** pepsin **or** catalase)

Substrate: **Matching** substrate named (starch **or** protein **or** hydrogen peroxide) **3**

(ii) Briefly describe how you prepared this enzyme.

Preparation described **Must match named enzyme** **3**

(iii) How did you vary the temperature?

Used water baths or described **3**

(iv) Name a factor that you kept constant during the activity.

pH **or** other correct factor **3**

(v) How was the factor named in part (b) (iv) above kept constant?

pH buffer **or** other correct **Must match named factor from part (iv)** **3**

(vi) Give a safety precaution you took during the activity.

Correct safety precaution given **3**

(vii) Label axes **A** and **B**.

A: Rate **3**

B: Temperature **3**

Q9 (b) (i) – (vii)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 10 **30**

2(3)

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

Diet / smoking / stress / other correct **Any two** **2(3)**

Q10 (a)	**Number of correct responses**	1	2
	Mark	3	6

8(3)

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

Place fingers on wrist **or** observe breathing **or** described / count number of beats (or breaths) / per unit time **Any two** **2(3)**

(ii) Draw a suitable graph to represent the data of **either** pulse rate (**PR**) **or** breathing rate (**BR**).

Suitable graph with **three** correct points (or levels) plotted **3(3)**

Points or levels plotted must match y-axis label

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

It would return to resting rate **3**

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

Check validity of results **or** other correct reason **3**

(v) Describe a safety precaution the student would have taken.

Correct safety precaution described **3**

Q10 (b) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Section C	**Best 4**	**4(60)**

Question 11 **60**

3(3)

(a) (i) What is the primary source of energy for organisms on Earth?

Sun **3**

(ii) Define the following terms as used in ecology:

1. Biosphere: Part(s) of the Earth where life can exist **3**
2. Niche: (Functional) role of an organism (in its habitat) **3**

Q11 (a) (i) – (ii)	**Number of correct responses**	1	2	3
	Mark	3	6	9

9(3)

(b) (i) Name the producer from the food web.

Grasses **3**

(ii) Name a primary consumer from the food web.

Snail **or** mouse **or** grasshopper **or** mosquito **3**

(iii) Name a secondary consumer from the food web.

Thrush **or** robin **or** badger **or** bat **or** fox **or** barn owl **3**

(iv) What do the arrows on the diagram mean?

Order of consumption or energy flow **3**

(v) **1.** Write down any **one** food chain from the food web.

Food chain starting with producer **3**

Organisms in correct order **3**

2. How many feeding (trophic) levels are in your food chain?

Correct number of matching feeding levels **3**

(vi) Sketch a pyramid of numbers for the food chain you wrote down above.

Correct shape of pyramid of numbers **3**

with correct order of named organisms **Producer must be at base** **3**

Q11 (b) (i) – (vi)	**Number of correct responses**	1	2	3	4	5	6	7	8	9
	Mark	3	6	9	12	15	18	21	24	27

Question 11 (continued)

8(3)

(c)	**(i)**	**1.**	What is meant by the term *pollution*?	
			Harmful addition to the environment	**3**
		2.	Give **one** example of a pollutant.	
			Any valid example e.g. carbon dioxide **or** slurry run-off **or** plastic (in the sea)	**3**
		3.	Give **one** way in which pollution may be controlled.	
			Any valid example e.g. reduce fossil fuel use	**3**
	(ii)	**1.**	There are problems associated with waste disposal. Give any **one**.	
			Any valid waste disposal problem	**3**
		2.	Give **one** way in which waste can be minimised.	
			Reduce **or** reuse **or** recycle **or** repair **or** bottle return scheme **or** other correct	**3**
	(iii)	**1.**	Explain the term *conservation*.	
			Maintenance of an ecosystem	**3**
		2.	Give **one** conservation practice from **one** of the following areas: **agriculture**; **fisheries**; **forestry**; and explain the reason for this conservation practice.	
			Valid conservation practice given	**3**
			Valid reason for practice stated	**3**

Q11 (c) (i) – (iii)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 12 **60**

3(3)

(a) (i) Explain the term *metabolism*.

(All) chemical reactions in an organism **3**

(ii) State whether **each** of the following are anabolic **or** catabolic.

1. (Respiration is) catabolic **3**

2. (Photosynthesis is) anabolic **3**

Q12 (a) (i) – (ii)	**Number of correct responses**	1	2	3
	Mark	3	6	9

9(3)

(b) (i) Complete the balanced equation for aerobic respiration:

CO_2 **3**

H_2O **3**

(ii) What is the name given to the substance with the formula, $\mathbf{C_6H_{12}O_6}$?

Glucose **3**

(iii) Where in a cell does stage 1 occur?

Cytosol **3**

(iv) What is the name of the organelle shown in the diagram in which stage 2 of aerobic respiration occurs?

Mitochondrion **3**

(v) Describe the differences between stage 1 **and** stage 2 of aerobic respiration using the following headings:

1. Amount of energy released in stage 1

Low (or small) **3**

2. Amount of energy released in stage 2

High (or large) **3**

3. Oxygen requirement of stage 1

Oxygen not required **3**

4. Oxygen requirement of stage 2

Oxygen required **3**

Q12 (b) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8	9
	Mark	3	6	9	12	15	18	21	24	27

Question 12 (continued)

8(3)

(c) (i) What is the name of the organelle shown?

Chloroplast **3**

(ii) What is the name given to the green pigment present in the organelle you named above that traps sunlight energy?

Chlorophyll **3**

(iii) Name the **three** components that result from the splitting of water.

H^+ (ions) or protons **3**

Electrons **3**

Oxygen (gas) **3**

(iv) State what happens to **each** of the components you named above.

H^+ ions: Used to make glucose **or** taken up by energy carrier **3**

Electrons: Used to make glucose **or** taken up by energy carrier **3**

Oxygen gas: Used in respiration **or** released to the atmosphere **3**

Q12 (c) (i) – (iv)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 13 **60**

3(3)

(a) (i) Explain in detail the term *evolution*.

Change in genetic makeup **3**

over time **or** in response to environment **3**

(ii) Name **either one** of the 19th century British biologists who introduced the theory of evolution by natural selection.

(Charles) Darwin **or** (Alfred Russell)-Wallace **3**

Q13 (a) (i) – (ii)	**Number of correct responses**	1	2	3
	Mark	3	6	9

9(3)

(b) (i) Both parents were homozygous and the F1 (first generation) offspring were heterozygous. Explain the underlined terms.

Homozygous: two (or both) alleles (of a gene) are the same **3**

Heterozygous: two (or both) alleles (of a gene) are different **3**

(ii) Give the genotypes of both parents.

PP **3**

pp **3**

(iii) Copy the Punnett square **into your answerbook and** complete it to show the genotypes of the F2 offspring.

	P	**p**
P	PP	Pp
p	Pp	pp

4(3)

(iv) What fraction **or** percentage of the F2 offspring is white-flowered?

25% (or one quarter) **3**

Q13 (b) (i) – (iv)	**Number of correct responses**	1	2	3	4	5	6	7	8	9
	Mark	3	6	9	12	15	18	21	24	27

Question 13 (continued)

8(3)

(c)	**(i)**	Which type of cell division (**mitosis** or **meiosis**) is directly involved in producing gametes?		
		Meiosis		**3**
	(ii)	Give **two** agents **or** substances that can increase the rate of DNA mutations and can potentially cause cancer.		
		UV light / cigarette smoke / other correct	**Any two**	**2(3)**
	(iii)	What is a 'species'?		
		Group of (similar) organisms		**3**
		that can interbreed to produce fertile offspring		**3**
	(iv)	Give **two** applications (or uses) of DNA profiling.		
		Species identification / paternity testing / crime scene investigation / other correct	**Any two**	**2(3)**
	(v)	Give **one** application (or use) of genetic screening.		
		Testing for a (mutated) gene		**3**

Q13 (c) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 14 **60**

3(3)

(a) Match **each** of these kingdoms to the following named organisms below:

(i) Bacteria: Monera **3**

(ii) Amoeba: Protista **3**

(iii) Rhizopus: Fungi **3**

Q14 (a) (i) – (iii)	**Number of correct responses**	1	2	3
	Mark	3	6	9

9(3)

(b) **(i)** Draw a diagram of a typical bacterial cell **and** label the following parts:
Cell wall; **DNA**; **Cytosol**

Diagram: Cell wall **and** cell membrane **and** DNA **3**

Labels: Cell wall **3**

DNA **3**

Cytosol **3**

(ii) Bacteria can be classified based on their shape. Name any bacterial shape.

Round **or** rod **or** spiral **3**

(iii) Some bacteria are pathogenic. Explain the underlined term.

Disease causing **3**

(iv) Give **one** example of a beneficial bacterium.

Any valid beneficial bacterium **3**

(v) What is binary fission?

(Asexual) reproduction (in bacteria) **3**

(vi) State any **one** factor that influences the growth of bacteria.

pH **or** temperature **or** other correct **3**

Q14 (b) (i) – (vi)	**Number of correct responses**	1	2	3	4	5	6	7	8	9
	Mark	3	6	9	12	15	18	21	24	27

Question 14 (continued)

8(3)

(c) (i) Match **each** of the parts of *Amoeba* labelled **A**, **B** and **C** with the following terms: **Pseudopod**; **Nucleus**; **Contractile vacuole**

1. Pseudopod: **B** **3**

2. Nucleus: **A** **3**

3. Contractile vacuole: **C** **3**

(ii) Which of the above-mentioned parts does *Amoeba* use to move around?

Pseudopod (or **B**) **3**

(iii) Which of the above-mentioned parts does *Amoeba* use to control the amount of water inside the cell?

Contractile vacuole (or **C**) **3**

(iv) Match **each** of the sentences below to the terms *asepsis* **and** *sterility*?

Absence of pathogens: Asepsis **3**

Absence of all microorganisms: Sterility **3**

(v) Describe how you would dispose of micro-organisms safely at the end of a laboratory activity.

Soak in disinfectant (for 24 hours and then placed in general waste) **<u>or</u>** autoclave (and then placed in general waste) **3**

Q14 (c) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 15 **60**

3(3)

(a) (i) Explain the term *secondary sexual characteristics*.

Traits that distinguish male from female **3**

other than the sex organs **3**

(ii) Give **one** example of a secondary sexual characteristic in humans.

Breasts **or** pubic hair **or** wide hips **or** broad shoulders **or** facial hair **or** deep voice **3**

Q15 (a) (i) – (ii)	**Number of correct responses**	1	2	3
	Mark	3	6	9

9(3)

(b) (i) Match **each** of the parts labelled **A**, **B**, and **C** with the following terms:

1. Uterus: **C** **3**

2. Fallopian tube: **A** **3**

3. Ovary: **B** **3**

(ii) In which labelled part are egg cells produced?

Ovary (or **B**) **3**

(iii) In which labelled part does fertilisation take place?

Fallopian tube (or **A**) **3**

(iv) Which gamete is larger, the sperm cell or the egg cell?

Egg cell **3**

(v) Sketch the structure of a sperm cell.

Sketch showing head **and** tail **3**

(vi) **One** function of vagina

Receives penis during copulation **or** birth canal **3**

One function of endometrium

Receives blastocyst **or** helps form placenta **or** supplies nutrients to developing embryo **or** other correct **3**

Q15 (b) (i) – (vi)	**Number of correct responses**	1	2	3	4	5	6	7	8	9
	Mark	3	6	9	12	15	18	21	24	27

Question 15 (continued)

8(3)

(c) (i) What is meant by the term *infertility*?

Inability to produce offspring **or** other correct description **3**

(ii) Give **one** cause of infertility in the human.

Endocrine gland failure **or** low sperm motility **or** other correct **3**

(iii) Give a possible corrective measure for infertility.

Hormonal treatment **or** change of lifestyle **or** surgical intervention **or** other correct **3**

(iv) **1.** What is meant by the term *birth control*?

Prevention of fertilisation (or implantation) **3**

2. Give **two** methods of birth control.

Surgical / mechanical / chemical / natural / named example **Any two** **2(3)**

(v) Give any **two** biological benefits of breastfeeding.

Mother-baby bond / correct temperature / correct nutrients / pathogen free / contains antibodies / other correct **Any two** **2(3)**

Q15 (c) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8
	Mark	3	6	9	12	15	18	21	24

Question 16	Any two of (a), (b), (c), (d)	30, 30

Question 16 (a) — **30**

10(3)

(i) Match tissues **A** and **B** to the following terms:

1. Ground: **B** — **3**

2. Dermal: **A** — **3**

(ii) **1.** Give **one** function of xylem.

Transport water or minerals — **3**

2. Give **one** function of phloem.

Transport food — **3**

(iii) Which of the following terms describes evaporation of water into the airspaces of the leaf?

Transpiration — **3**

(iv) Which labelled structure does the water exit through?

Stoma — **3**

(v) Match **each** of the leaves **X** and **Y** to the following terms:

1. Parallel venation: **Y** — **3**

2. Net venation **X** — **3**

(vi) Match **each** of the types of leaf venation (**parallel** and **net**) to the following terms:

1. Monocotyledonous: Parallel (or **Y**) — **3**

2. Dicotyledonous: Net (or **X**) — **3**

Q16 (a) (i) – (vi)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 16 (b) **30**

10(3)

(i) Match **each** of the parts labelled **A**, **B** and **C** with the following terms:

1. Stomach: **B** **3**

2. Large Intestine: **D** **3**

3. Oesophagus: **A** **3**

4. Small intestine: **C** **3**

(ii) Explain the following terms:

1. Ingestion

Taking in food **3**

2. Digestion

Breaking down food **3**

(iii) Why is digestion is important in the body?

(So that nutrients) can be absorbed into the blood **or** other correct **3**

(iv) Give any **one** function of the liver.

To produce bile **or** detoxify alcohol (or drugs) **or** breakdown blood cells **or** other correct **3**

(v) Give **one** function of symbiotic bacteria.

Digestion (of cellulose) **or** producing vitamins (or named vitamin) **or** compete with pathogens **or** other correct **3**

(vi) Why is fibre an important part of the diet?

Stimulates peristalsis **or** other correct **3**

Q16 (b) (i) – (vi)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 16 (c) **30**

10(3)

(i) Match **each** of the parts labelled **A**, **B** and **C** with the following terms:

1. Petal: **C** **3**

2. Stigma: **A** **3**

3. Anther: **B** **3**

(ii) Match **each** of the parts of the flower with the following functions:

1. Traps pollen

Stigma (or **A**) **3**

2. Attracts pollinators (e.g. insects)

Petal (or **C**) **3**

3. Produces pollen

Anther (or **B**) **3**

(iii) What is meant by the term *pollination*?

Transfer of pollen from the anther to the stigma **3**

(iv) State **two** types of pollination.

Animal / wind / water / self / cross **Any two** **2(3)**

(v) Is part **B** the female **or** male part of the flower?

Male **3**

Q16 (c) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 16 (d)				**30**
		10(3)		
(i)	Match **each** of the parts labelled **X**, **Y** and **Z** with the following terms:			
	1. Blood vessel:	**Z**		**3**
	2. Hair:	**X**		**3**
	3. Sebaceous gland:	**Y**		**3**
(ii)	Name **one** substance that the skin excretes.			
	Sweat **or** named component of sweat			**3**
(iii)	Explain its role in the general defence system.			
	Acts as a barrier (to prevent entry of pathogens) **or** described			**3**
(iv)	Briefly describe **one** way the skin can help regulate body temperature.			
	Hair raises to trap air to act as an insulator **or** sweat gland release sweat to evaporate **or** blood vessels dilate to release heat **or** hair lies flat to increase heat loss **or** sweat glands stop producing sweat to conserve heat **or** blood vessels constrict to retain heat			**3**
(v)	Name **two** other excretory organs in the human body **and** name a substance that **each** organ excretes.			
	Name:	Lungs		**3**
	Substance excreted:	Carbon dioxide **or** water vapour	**Must match named organ**	**3**
	Name:	Kidney		**3**
	Substance excreted:	Water **or** urea **or** salt **or** other correct	**Must match named organ**	**3**

Q16 (d) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 17	Any two of (a), (b), (c), (d)	30, 30

Question 17 (a) **30**

10(3)

(i)	**1.**	Which of the labelled structures contains food?	
		Endosperm **<u>or</u>** cotyledon	**3**
	2.	Which of the labelled parts consists of a radicle and plumule?	
		Embryo	**3**
(ii)	**1.**	Where is the testa located?	
		On the outside of the seed	**3**
	2.	What is the function of the testa?	
		Protection	**3**
(iii)	**1.**	What is meant by the term *dormancy*?	
		Resting period of the seed **<u>or</u>** period of low metabolic activity in seed	**3**
	2.	Give **two** advantages of dormancy for the seed.	
		Allows time for development / allows time for dispersal / allows time for maturation / to avoid harsh conditions / other correct **Any two**	**2(3)**
(iv)		List the **three** factors that are essential for germination.	
		Oxygen	**3**
		Water	**3**
		Warmth or suitable temperature	**3**

Q17 (a) (i) – (iv)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 17 (b)			**30**
	10(3)		
(i)	To which major organ are these impulses sent?		
	Brain		**3**
(ii)	Match **each** of the parts labelled **A**, **B** and **C** with the following terms:		
	1. Ossicle:	**B**	**3**
	2. Eardrum:	**A**	**3**
	3. Cochlea:	**C**	**3**
(iii)	Match **each** of the following parts of the human ear with the following functions		
	1. Transfers sound vibrations through the middle ear		
	Ossicles (or **B**)		**3**
	2. Receives sound waves from the auditory canal		
	Eardrum (or **A**)		**3**
	3. Generates nerve impulses		
	Cochlea (or **C**)		**3**
(iv)	Why is the middle ear connected to the throat by the Eustachian tube?		
	To equalise the pressure (on either side of the eardrum) **<u>or</u>** described		**3**
(v)	Name any other **two** senses.		
	Sight / touch / smell / taste	**Any two**	**2(3)**

Q17 (b) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 17 (c)			**30**
		10(3)	
(i)	What is meant by the term *vegetative propagation*?		
	Asexual reproduction in plants		**3**
(ii)	Give **two** examples of plants that undergo vegetative propagation. For **each**, state which organ (**stem, root, leaf or bud**) the plant uses.		
	Named plant		**3**
	Matching organ used		**3**
	Named plant		**3**
	Matching organ used		**3**
(iii)	**1.** Give **one** advantage that vegetative propagation has over reproduction by seed.		
	Faster **or** other correct		**3**
	2. Give **one** advantage that reproduction by seed has over vegetative propagation.		
	Offspring are not genetically identical **or** other correct		**3**
(iv)	Name any **three** methods of artificial propagation.		
	Cutting / grafting / layering / micropropagation / other correct	**Any three**	**3(3)**

Q17 (c) (i) – (iv)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

Question 17 (d)			**30**
(i)	What is meant by the term *hormone*?		
	Chemical / messenger (or described) / secreted into the blood stream / travels in blood / to effector **or** has an effect elsewhere (or described)	**Any two**	**2(3)**
(ii)	Match **each** of the parts of the endocrine system labelled **A**, **B** and **C** with the following terms:		
	1. Thyroid: **B**		**3**
	2. Pancreas: **A**		**3**
	3. Testis: **C**		**3**
(iii)	Match **each** gland **A**, **B** and **C** with the following hormones:		
	1. Insulin: **A**		**3**
	2. Thyroxine: **B**		**3**
	3. Testosterone: **C**		**3**
(iv)	Name **one** gland in the body that has an endocrine **and** exocrine function.		
	Pancreas **or** liver **or** other correct		**3**
(v)	Give **one** example of the **use** of a hormone supplement.		
	HRT **or** other correct		**3**

Q17 (d) (i) – (v)	**Number of correct responses**	1	2	3	4	5	6	7	8	9	10
	Mark	3	6	9	12	15	18	21	24	27	30

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