



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2023

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.630** *Instructions to Examiners, 2023 (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**.

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 ghnóthaíonn 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

Question 1

2(7) + 3(2)

- (a) Give **one** source of carbohydrate in the diet.
Any correct source
- (b) Name **one** element found in carbohydrates.
Carbon **or** hydrogen **or** oxygen
- (c) Give **one** structural role of carbohydrates in living organisms.
They make up plant cell walls **or** other correct role
- (d) Two monosaccharides can join together to form a
- Disaccharide
- (e) Name a polysaccharide found in plants.
Starch **or** cellulose **or** pectin **or** other correct

Q1 (a) – (e)	Number of correct responses	1	2	3	4	5
	Mark	7	14	16	18	20

Question 2

8 + 7 + 5(1)

Indicate whether the statements are true or false:

- (a) A hypothesis is a possible explanation for an observation.
- (b) A good experiment requires a small sample size.
- (c) Data always involves numbers.
- (d) Safety is an important principle of experimentation.
- (e) Random selection is an important principle of experimentation.
- (f) The scientific method has limitations.
- (g) A theory is an unsupported hypothesis.

True False

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Q2 (a) – (g)	Number of correct responses	1	2	3	4	5	6	7
	Mark	8	15	16	17	18	19	20

Question 3

2(7) + 3(2)

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

Hydrochloric acid **Villi** **Liver** **Bile** **Egestion** **Peristalsis**

Column A	Column B
Present in the stomach	Hydrochloric acid
(a) <i>Contraction and relaxation of the muscles of the gut wall.</i>	Peristalsis
(b) <i>Stored in the gall bladder.</i>	Bile
(c) <i>Increase surface area for absorption in the small intestine.</i>	Villi
(d) <i>Process by which food waste is passed from the body.</i>	Egestion
(e) <i>Organ that breaks down alcohol.</i>	Liver

Q3 (a) – (e)	Number of correct responses	1	2	3	4	5
	Mark	7	14	16	18	20

Question 4

8 + 7 + 5(1)

- (a) *Identify gases X and Y.*
 X: O₂ or oxygen
 Y: CO₂ or carbon dioxide
- (b) *Describe the difference between the two stages in terms of the amount of energy released.*
 Stage 1: small amount of energy released
 Stage 2: large amount of energy released
- (c) *State **two** ways in which the released energy may be used in living organisms.*
 Growth / repair / movement / other correct **Any two**
- (d) *Name the product formed in the athlete's muscles as a result of anaerobic respiration.*
 Lactic acid

Q4 (a) – (d)	Number of correct responses	1	2	3	4	5	6	7
	Mark	8	15	16	17	18	19	20

Question 5**8 + 7 + 5(1)**

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

A: Eye piece

B: Objective (lens)

(b) *Using the letter 'X', indicate on the diagram above the source of light.*

Correct location indicated

(c) *What is the function of the stage on the microscope?*

Hold the specimen (or slide)

(d) *If the magnification of lens A is x10 and B is x40, what is the total magnification?*

X400

(e) *What is the function of a stain when using a light microscope?*

To make the cells more visible

(f) *Name another type of microscope.*

Electron

Q5 (a) – (f)	Number of correct responses	1	2	3	4	5	6	7
	Mark	8	15	16	17	18	19	20

Question 6**8 + 7 + 5(1)**

(a) *How many strands make up a DNA molecule?*

Two

(b) *Name any **two** nitrogenous bases found in DNA.*

Adenine / guanine / thymine / cytosine

Any two

(c) *Three bases together are known as a*

Codon or triplet

(d) *Where in the cell would you expect to find most DNA?*

Nucleus

(e) *DNA contains the instructions needed to make protein. This is called the code.*

Genetic

(f) *Name a complementary structure to DNA that is involved in protein synthesis.*

RNA

Q6 (a) – (f)	Number of correct responses	1	2	3	4	5	6	7
	Mark	8	15	16	17	18	19	20

Question 7**8 + 7 + 5(1)**

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

A: Dendrite

B: Axon

C: Schwann cell **or** myelin sheath

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

Receive impulses

(c) *Draw an arrow showing the direction the nerve impulse will travel in **this** neuron.*

Arrow from left to right

(d) *Name the chemicals used to transmit nerve impulses from one neuron to another.*

Neurotransmitters or named neurotransmitter

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

Parkinson's **or** paralysis **or** any other correct

Q7 (a) – (e)	Number of correct responses	1	2	3	4	5	6	7
	Mark	8	15	16	17	18	19	20

Question 8

30

5 + 1

- (a) Describe the difference between the terms, flora and fauna by writing a note on
- each**
- .

Flora: Plants

Fauna: Animals

8 (a)	Number of correct responses	1	2
	Mark	5	6

2(9) + 6(1)

- (b) (i) Describe how this survey may have been carried out.

Pen thrown over shoulder or randomly / quadrat / placed where pen landed /
presence or absence of plant noted / calculation / repeat

Any three

- (ii) Calculate the percentage frequency of dandelion
- and**
- grass in this habitat.

Dandelion: 60%

Grass: 100%

- (iii) Sketch a bar chart to represent the % frequency of dandelion and grass. Label both axes.

x axis: Type of plant (or grass and dandelion)

y axis: % frequency

Bars representing dandelion **and** grass

Q8 (b) (i) – (iii)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	9	18	19	20	21	22	23	24

Question 9

30

5 + 1

(a) *What is meant by the term osmosis?*

Movement of water

Through a semi-permeable membrane or from a region of high water concentration to a region of low water concentration

Q9 (a)	Number of correct responses	1	2
	Mark	5	6

2(9) + 6(1)

(b) (i) *Draw a labelled diagram of the apparatus that you used to demonstrate osmosis.*

Diagram showing two solutions and membrane or tissue

Any two correct labels

(ii) *Describe how you carried out the experiment to demonstrate osmosis.*

Material described or tissue mentioned / different solutions of sugar prepared / left for a time/ control described / measure volume or mass before / measure volume or mass after / or other correct step

Any four

(iii) *How were you able to tell that osmosis had taken place?*

Mass or volume or shape changed

Q9 (b) (i) – (iii)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	9	18	19	20	21	22	23	24

Question 10

30

5 + 1

- (a) (i) *What is meant by the term sterile?*
Free from microorganisms
- (ii) *Give **one** method of sterilising apparatus.*
Autoclave **or** flaming

Q10 (a) (i) – (ii)	Number of correct responses	1	2
	Mark	5	6

2(9) + 6(1)

- (b) (i) *Name a suitable plant from which leaves can be obtained to carry out this investigation.*
Ash **or** other correct
- (ii) *Name a suitable container that can be used to grow leaf yeast.*
Petri dish
- (iii) *Suggest a reason for the presence of malt in the agar.*
Food source for yeast
- (iv) *Describe how leaf yeast could be introduced into the malt agar.*
Cut leaf to size / mention of an aseptic technique / attach leaf to lid of container / using petroleum jelly (or other correct) / with the underside of the leaf facing the agar **Any two**
- (v) *Describe a suitable control for this investigation.*
Same setup with no leaf **or** same setup with a sterilised leaf
- (vi) *What colour are leaf yeast colonies on malt agar?*
Pink
- (vii) *Suggest a reason for the lower number of leaf yeast present on leaves in May versus September.*
Younger leaves **or** not enough time for leaf yeast to grow

Q10 (b) (i) – (vii)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	9	18	19	20	21	22	23	24

Question 11

60

5 + 2(2)

- (a) (i) *What is meant by the term pollution?*
Any harmful addition to the environment
- (ii) *Describe **one** human activity that may cause pollution **and** suggest **one** way in which this pollution could be controlled.*
Human activity: Any valid activity
Prevent: Any valid and matching preventative measure

Q11 (a) (i) – (ii)	Number of correct responses	1	2	3
	Mark	5	7	9

3(5) + 6(2)

- (b) (i) *Match pyramids **A** and **B** above with a possible correct ecosystem.*
A: Woodland or grassland
B: Rocky seashore or marine
- (ii) *Name a producer in pyramid **A**.*
Grass
- (iii) *Name the source of energy for the producer.*
Sun
- (iv) *Name the primary consumer in pyramid **B**.*
Sea slug
- (v) *What information do ecological pyramids provide us with?*
(Relative) numbers of organisms (at each trophic level)
- (vi) *Suggest what might happen if the bladderwrack was removed from the habitat represented in pyramid **B**.*
The numbers of sea slugs would decrease or other correct
- (vii) *Suggest what might happen if the top consumer in pyramid **A** died off due to disease.*
The numbers of mice would increase or other correct
- (viii) *How might you identify the animals and plants listed in the pyramids?*
Key or other correct

Q11 (b) (i) – (viii)	Number of correct responses	1	2	3	4	5	6	7	8	9
	Mark	5	10	15	17	19	21	23	25	27

Question 11 (continued)**2(6) + 6(2)**(c) (i) *What ecological term describes soil factors?*

Edaphic

(ii) *Name any **two** essential nutrients present in healthy soil.*

Nitrogen / potassium / other correct

Any two(iii) *Name any **two** soil factors that can have an effect on living organisms present in the soil.*

pH / temperature / moisture content / organic matter (content) / clay type / particle size / other correct

Any two(iv) *Give **one** biotic factor mentioned in the article.*

Any one correct

(v) *Suggest a possible source of nitrogen compounds in the soil.*Decay of organic matter **or** other correct(vi) *Give a reason why it is important for nutrients to be recycled.*So they can be reused by other organisms **or** so they do not run out

Q11 (c) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	6	12	14	16	18	20	22	24

Question 12

60

5 + 2(2)

(a) (i) Name the **two** biochemicals that make up chromosomes.

Protein

DNA

(ii) How many chromosomes are in a diploid human cell?

46

Q12 (a) (i) – (ii)	Number of correct responses	1	2	3
	Mark	5	7	9

3(5) + 6(2)

(b) (i) Explain the underlined terms.

Allele: Form of a gene

Dominant: Masks effect of recessive allele

(ii) What colour are Jack's eyes?

Brown

(iii) Which of the following terms describes Jack's genotype?

Heterozygous

(iv) Write out Sarah's genotype for eye colour.

bb

(v) Give the genotypes of the **two** possible gametes that Jack can produce.

B

b

(vi) Write out the **two** phenotypes of their possible offspring.

Brown eyes

Blue eyes

Q12 (b) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9
	Mark	5	10	15	17	19	21	23	25	27

Question 12 (continued)**2(6) + 6(2)**

(c) (i) *Distinguish between a tissue **and** an organ by writing a brief sentence on **each**.*

Tissue: Group of cells with a shared function

Organ: A group of tissues with a shared function.

(ii) *Name **two** types of tissue found in animals.*

Muscle / epithelial (or epidermal) / nervous / connective

Any two

(iii) *Suggest **one** reason why sterile conditions are necessary in tissue culture.*

Prevent contamination (with unwanted microorganisms)

(iv) *Name the type of cell division that occurs in tissue culture where genetically identical cells are grown.*

Mitosis

(v) *How many cells result from one cell undergoing the type of cell division you named above?*

2

(vi) *Give **one** application of tissue culture.*

Plant breeding or micropropagation **or** cancer research **or** skin grafts **or** other correct

Q12 (c) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	6	12	14	16	18	20	22	24

Question 13

60

5 + 2(2)

- (a) (i) *Name a pigment essential for photosynthesis.*
Chlorophyll
- (ii) *Where in a plant cell can the pigment you named in part (a) (i) above be found?*
Chloroplast
- (iii) *Give **one** source of this energy.*
Sunlight (or other correct)

Q13 (a) (i) – (iii)	Number of correct responses	1	2	3
	Mark	5	7	9

3(5) + 6(2)

- (b) (i) *Name the **three** products of the splitting of water.*
Oxygen **or** O₂
Electrons **or** e⁻
Protons **or** H⁺ **or** H ions
- (ii) *Where does the plant obtain the water required for photosynthesis?*
Through roots **or** from the soil **or** from xylem **or** other correct
- (iii) *Suggest a reason for the leaf being very thin.*
To allow light to penetrate the leaf **or** other correct reason
- (iv) *Name gas X.*
Carbon dioxide
- (v) *What is the main product of photosynthesis?*
Glucose or sugar
- (vi) *Describe **two** methods horticulturists can use to improve crop growth in greenhouses.*
Carbon dioxide enrichment / more light / increase temperature / other correct **Any two**

Q13 (b) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9
	Mark	5	10	15	17	19	21	23	25	27

Question 13 (continued)**2(6) + 6(2)**

(c) (i) *Explain the underlined terms.*

Enzymes: Biological catalysts

Metabolism: (All) chemical reactions within an organism

(ii) *Where in a cell are enzymes produced?*

Ribosomes

(iii) *Name **two** factors that can affect enzyme action.*

pH / temperature / enzyme concentration / substrate concentration

Any two

(iv) *What is meant by the **immobilisation** of an enzyme?*

Trapping in an inert material

(v) *Give **two** advantages of bioprocessing using immobilised enzymes.*

Can be reused / cleaner product / more efficient

Any two

Q13 (c) (i) – (v)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	6	12	14	16	18	20	22	24

Question 14

60

5 + 2(2)

- (a) (i) *State **one** function of oestrogen*
 Causes lining of endometrium (uterus) to thicken or other correct
- (ii) *Name **one** other female reproductive hormone **and** state its function.*
 Name: Progesterone
 Function: Keep lining of uterus built up or other correct

Q14 (a) (i) – (ii)	Number of correct responses	1	2	3
	Mark	5	7	9

3(5) + 6(2)

- (b) (i) *Name the parts labelled **A, B,** and **C.***
 A: Ovary
 B: Fallopian tube
 C: Uterus
- (ii) *In which labelled part is the ovum (egg) formed?*
 Ovary or A
- (iii) *What type of cell division is involved in production of the ovum (egg)?*
 Meiosis
- (iv) *State **one** way in which the ovum (egg) differs from a sperm cell.*
 Non-motile or no tail or larger
- (v) *Explain the term fertilisation.*
 Fusion of gametes or formation of zygote
- (vi) *State the location from the diagram above where **each** of the following occurs:*
 1. *Fertilisation:* B or fallopian tube
 2. *Implantation:* C or uterus or endometrium

Q14 (b) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9
	Mark	5	10	15	17	19	21	23	25	27

Question 14 (continued)**2(6) + 6(2)**(c) (i) Give any **one** function of the placenta.

Hormone production **or** transfer of nutrients (from mother to foetus) **or** transfer of wastes (from foetus to mother) **or** keep mother's blood and foetus' blood from mixing **or** other correct

(ii) Describe the main events of the birth process in humans.

Labour or contractions or waters break or cervix dilates

Parturition or baby passes through birth canal

Afterbirth (or described) or umbilical cord cut

(iii) Describe any **two** biological benefits of breastfeeding.

Baby receives antibodies / milk is correct temperature / mother-baby bond / sterile (or contains no pathogens) / all correct nutrients present / any other correct benefit **Any two**

(iv) Name **two** methods of contraception.

Any two correct methods or examples

Any two

Q14 (c) (i) – (iv)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	6	12	14	16	18	20	22	24

5 + 2(2)

- (a) (i) Give
- two**
- differences between an artery and vein.

Arteries have thicker walls than veins / arteries have narrower lumens than veins / arteries do not have valves, veins have valves / arteries carry blood from heart, veins carry blood towards heart.

Any two

- (ii) Name the small blood vessels that are responsible for exchange of substances with body cells.

Capillaries

Q15 (a) (i) – (ii)	Number of correct responses	1	2	3
	Mark	5	7	9

3(5) + 6(2)

- (b) (i) Where in the body are the lungs located?

Chest or thorax or behind ribs

- (ii) What is the function of the rings of cartilage found in the trachea?

Keep trachea open or prevent collapse of trachea

- (iii) Give the function of alveoli
- and**
- give
- one**
- feature that enables it to carry out this role.

Function: Gas exchange

Feature: Thin wall or moisture layer or surrounded by capillaries

- (iv) Describe the role of each of the following during inhalation:

1. Diaphragm Contracts or moves down or increases chest volume

2. Intercostal muscles: Contracts or causes the rib cage to move up and out or increases chest volume

3. Brain: Brain sends signal to muscles

- (v) Name
- one**
- breathing disorder
- and**
- give a possible cause.

Name: Bronchitis or asthma or other correct

Cause: Matching cause named or described

Q15 (b) (i) – (v)	Number of correct responses	1	2	3	4	5	6	7	8	9
	Mark	5	10	15	17	19	21	23	25	27

Question 15 (continued)**2(6) + 6(2)**

(c) (i) *Name the blood vessel labelled A.*

Aorta

(ii) *Give **one** reason why the wall of chamber B is thicker than the wall of chamber C.*

Pumps blood further or maintains blood pressure

(iii) *What is the role of the bicuspid valve?*

Prevents backflow of blood (into the left atrium)

(iv) *Which part of the heart prevents oxygenated blood mixing with deoxygenated blood?*

Septum

(v) *1. Name the artery through which the heart muscle itself receives blood.*

Coronary (artery)

2. Suggest what might happen if this artery became blocked.

Heart attack

(vi) *Give **one** factor that can cause an increase in heart rate.*

Exercise or smoking or other correct

(vii) *State **one** feature of the diet that can harm the circulatory system.*

High fat diet or diet high in cholesterol or diet high in salt

Q15 (c) (i) – (vii)	Number of correct responses	1	2	3	4	5	6	7	8
	Mark	6	12	14	16	18	20	22	24

Question 16 (a)

30

2(7) + 8(2)(i) *Explain in detail the term excretion.*

Removal of waste products

Of metabolism or from the cell or made in the body

(ii) *Match the parts labelled D, E, and F with the following terms: medulla, renal pelvis, cortex*

D: Cortex

E: Medulla

F: (Renal) pelvis

(iii) *Name this other part.*

Bladder

(iv) *Give **one** function of this layer of fat.*

Protection

(v) *Give the locations in the kidney for each of the following:*1. *Filtration:* Cortex or D or Bowman's capsule or glomerulus2. *Reabsorption:* Cortex or D or medulla or E or correctly named part of nephron(vi) *Name an excretory organ in the human body, other than the kidney.*Skin or lungs

Q16 (a) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

2(7) + 8(2)

(i) Match the parts labelled X, Y and Z with the following terms: lens; iris; cornea

X: Iris

Y: Cornea

Z: Lens

(ii) What is the function of the part labelled Y?

Allows light to enter the eye

(iii) Which labelled part focuses the light rays?

Z or lens (allow Y or cornea)

(iv) Where are light rays usually focused?

Retina

(v) What would you expect to happen to the diameter of the pupil in bright light?

Gets smaller

(vi) To which organ do these impulses travel?

Brain

(vii) Name a disorder of the eye **or** the ear **and** give a corrective measure.Eye: Named disorder **or** Ear: Named disorder

Matching corrective measure

Q16 (b) (i) – (vii)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

Question 16 (c)

30

2(7) + 8(2)

(i) *Match the plant tissues labelled A, B and C with the following terms: ground; vascular; dermal*

A: Vascular

B: Ground

C: Dermal

(ii) *Give **two** substances that are transported by the tissue labelled A.*

Water / food / mineral / other correct

Any two

(iii) *Name a type of cell located in the tissue labelled A.*

Xylem (tracheid or vessel) **or** phloem **or** sieve tube **or** companion (cell)

(iv) *What is the function of the root hair?*

Absorption

(v) *Name any **two** ways in which a section through the stem would differ from the section shown above.*

No root hairs

Many vascular bundles

(vi) *What term describes a root's growth in response to gravity?*

Geotropism

Q16 (c) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

2(7) + 8(2)

- (i) Match the parts **X**, **Y** and **Z** with the following terms: ovule; sepal; stigma.
 X: Stigma
 Y: Ovule
 Z: Sepal
- (ii) What is the function of the part labelled **Z**?
 Protection (of the developing flower)
- (iii) On which labelled part are pollen grains received?
 X or stigma
- (iv) Give **one** possible adaptation of this flower that shows it is animal-pollinated.
 Coloured petals or nectar or anthers (or stigma) inside flower or other correct
- (v) Give **one** feature of a wind-pollinated flower.
 Small petals or green petals or feathery stigma or anthers outside flower or other correct
- (vi) In which labelled part does the seed develop?
 Y or ovule (accept ovary)
- (vii) Give **one** function of the fruit of a plant.
 Seed dispersal
- (viii) Give **one** reason why dormancy is of benefit to a plant.
 Allows survival of adverse conditions or allows time for dispersal or allows time for embryo to develop or other correct

Q16 (d) (i) – (viii)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

Question 17	Any two of (a), (b), (c), (d)	30, 30
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Question 17 (a)	30																								
2(7) + 8(2)																									
(i) Give two functions of the human skeleton. Strength / support / shape / movement / protection / blood cell production	Any two																								
(ii) Give one location in the human body where a hinge joint might be found. Knee <u>or</u> elbow <u>or</u> other correct																									
(iii) Name one other type of synovial joint. Ball and socket																									
(iv) Match the parts labelled D, E and F with the following terms: synovial fluid; cartilage; ligaments D: Ligament E: Cartilage F: Synovial fluid																									
(v) Name another two types of vertebrae. Thoracic / lumbar / sacral / caudal (or coccyx)	Any two																								
(vi) Name one disorder of the musculoskeletal system. Arthritis <u>or</u> osteoporosis <u>or</u> other correct																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Q17 (a) (i) – (vi)</td> <td style="width: 25%; text-align: center;">Number of correct responses</td> <td style="width: 5%; text-align: center;">1</td> <td style="width: 5%; text-align: center;">2</td> <td style="width: 5%; text-align: center;">3</td> <td style="width: 5%; text-align: center;">4</td> <td style="width: 5%; text-align: center;">5</td> <td style="width: 5%; text-align: center;">6</td> <td style="width: 5%; text-align: center;">7</td> <td style="width: 5%; text-align: center;">8</td> <td style="width: 5%; text-align: center;">9</td> <td style="width: 5%; text-align: center;">10</td> </tr> <tr> <td></td> <td style="text-align: center;">Mark</td> <td style="text-align: center;">7</td> <td style="text-align: center;">14</td> <td style="text-align: center;">16</td> <td style="text-align: center;">18</td> <td style="text-align: center;">20</td> <td style="text-align: center;">22</td> <td style="text-align: center;">24</td> <td style="text-align: center;">26</td> <td style="text-align: center;">28</td> <td style="text-align: center;">30</td> </tr> </table>	Q17 (a) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9	10		Mark	7	14	16	18	20	22	24	26	28	30	
Q17 (a) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9	10														
	Mark	7	14	16	18	20	22	24	26	28	30														

Question 17 (b)

30

2(7) + 8(2)

(i) *Explain in detail the term hormone.*

Chemical messenger

Secreted into the bloodstream

(ii) *Complete the table:*

<i>Name of Gland</i>	<i>Hormone</i>	<i>Function of Hormone</i>
Thyroid	<i>Thyroxine</i>	(Regulate) metabolism
Adrenal	<i>Adrenaline</i>	<i>To prepare the body for "fight or flight"</i>
<i>Testes</i>	Testosterone	Sperm production

(iii) *State **two** ways in which hormone action differs from nerve action.*

Chemical is carried in blood / slow acting / long lasting

Any two

(iv) *Give **one** example of the use of hormone supplements.*

Hormone replacement therapy or other correct

Q17 (b) (i) – (iv)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

Question 17 (c)

30

2(7) + 8(2)

- (i) *To which kingdom does Rhizopus belong?*
Fungi
- (ii) *Draw a labelled diagram of Rhizopus.*
Diagram: Sporangium **and** sporangiophore
Labels: Any two correct labels
- (iii) *Name **one** food on which Rhizopus commonly grows.*
Bread
- (iv) *In terms of nutrition, is Rhizopus a parasite or a saprophyte? Explain your answer.*
Saprophyte
Explain: Lives or feeds on dead (organic) matter
- (v) *Describe asexual reproduction in Rhizopus.*
Spores produced by sporangium and released
Spores land on a suitable substrate and germinate
- (vi) *What term describe asexual reproduction in yeast?*
Budding

Q17 (c) (i) – (vi)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

2(7) + 8(2)

(i) *To which kingdom do bacteria belong?*

Monera

(ii) *What shape of bacteria is shown?*

Spiral

(iii) *Name the method by which bacteria reproduce.*

Binary fission

(iv) *Explain the underlined terms.**Autotrophic:* Organism that makes its own food*Heterotrophic:* Organism that takes in food(v) *Give **one** example of how bacteria can be useful to humans.*Production of antibiotics or production of yoghurt or production of cheese or used in genetic engineering or decomposition or waste removal or other correct(vi) *1. What are pathogenic bacteria?*

Disease causing (organisms)

*2. Give **one** example of a pathogenic bacterium.*Named pathogenic bacterium (e.g. *E. coli*)(vii) *1. What are **antibiotics**?**Antibiotics:* chemicals (produced by bacteria to) to kill bacteria or fungi*2. Give **one** reason why it is important that antibiotics are not misused.**Misuse:* can lead to antibiotic resistance or other correct reason

Q17 (d) (i) – (vii)	Number of correct responses	1	2	3	4	5	6	7	8	9	10
	Mark	7	14	16	18	20	22	24	26	28	30

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