EXAM PAPERS PRACTICE

Inorganic ions

Level: OCR A Level H420
Subject: Biology
Exam Board: Suitable for all boards
Topic: Inorganic ions
Type: Mark Scheme

To be used by all students preparing for OCR A Level Biology H420 foundation or higher tier but also suitable for students of other boards.

Mark schemes

1

(a) 1. Polar molecule;

2. Acts as a (universal) solvent;

OR

3. (Universal) solvent;

4. (Metabolic) reactions occur faster in solution;

OR

5. Reactive;

6. Takes place in hydrolysis / condensation / named reaction;

Polar molecule so acts as (universal) solvent so (metabolic reactions are faster = 3 marks

4

(b) Name of ion;

Correct function within cell;

Ions other than sodium in specification are H^+, Fe^{2+} and PO_4^{3-} but accept any correct ion (other than sodium) plus relevant function = 2.

Allow ion to be named in words but not as element, e.g, iron ion but not iron.

2

(c) 1. Comparison: both move down concentration gradient;

2. Comparison: both move through (protein) channels in membrane;

Accept aquaporins (for water) and ion channels

3. Contrast: ions can move against a concentration gradient by active transport

3

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2 (a) greater rate of oxygen consumption / leads to greater rate of respiration and greater rate of uptake;

(allow this mark even if spread through account but cause and effect must be within the correct context)

oxygen required for respiration;
respiration produces ATP / releases energy;
(ignore ref to producing or making energy)
potassium ions taken up by active transport / against concentration gradient;

4

(b) (i) 0.25 (mol dm^{-3});

1

(ii) 1 mark Incorrect answer but derived from ratio of 1.2 and initial length of 90 mm
2 marks Correct answer of 108 mm;

2

(iii) water potential inside potato higher / less negative than in solution;
water moves out by osmosis;

2

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3 ***General principles for marking the Essay:***

Four skill areas will be marked: scientific content, breadth of knowledge, relevance and quality of language. The following descriptors will form a basis for marking.

Scientific content (maximum 16 marks)

Category	Mark	Descriptor
	16	
Good	14	Most of the material of a high standard reflecting a comprehensive understanding of the principles involved and a knowledge of factual detail fully in keeping with a programme of A-level study. Some material, however, may be a little superficial. Material is accurate and free from fundamental errors but there may be minor errors which detract from the overall accuracy.
	12	
	10	
Average	8	A significant amount of the content is of an appropriate depth, reflecting the depth of treatment expected from a programme of A-level study. Generally accurate with few, if any fundamental errors. Shows a sound understanding of most of the principles involved.
	6	
	4	
Poor	2	Material presented is largely superficial and fails to reflect the depth of treatment expected from a programme of A-level study. If greater depth of knowledge is demonstrated, then there are many fundamental errors.
	0	

Topics

3.1.3 Lipids

3.1.5 Nucleic acids are important information-carrying molecules

3.1.6 ATP

3.2.3 Transport across cell membranes

3.5.1 Photosynthesis

3.5.2 Respiration

3.5.4 Nutrient cycles

3.6.2 Nervous coordination

Breadth of Knowledge (maximum 3 marks)

Mark	Descriptor
3	A balanced account making reference to most if not all areas that might realistically be covered on an A-level course of study.
2	A number of aspects covered but a lack of balance. Some topics essential to an understanding at this level not covered.
1	Unbalanced account with all or almost all material based on a single aspect
0	Material entirely irrelevant.

Relevance (maximum 3 marks)

Mark	Descriptor
3	All material presented is clearly relevant to the title. Allowance should be made for judicious use of introductory material
2	Material generally selected in support of title but some of the main content of the essay is of only marginal relevance.
1	Some attempt made to relate material to the title but considerable amounts largely irrelevant.
0	Material entirely irrelevant or too limited in quantity to judge.

Quality of language (maximum 3 marks)

Mark	Descriptor
3	Material is logically presented in clear, scientific English. Technical terminology has been used effectively and accurately throughout.
2	Account is logical and generally presented in clear, scientific English. Technical terminology has been used effectively and is usually accurate.
1	The essay is generally poorly constructed and often fails to use an appropriate scientific style and terminology to express ideas.
0	Material entirely irrelevant or too limited in quantity to judge.

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Additional notes on marking

Care must be taken in using these notes. It is important to appreciate that the only criteria to be used in awarding marks to a particular essay are those corresponding to the appropriate descriptors. Candidates may gain credit for any information providing that it is biologically accurate, relevant and of a depth in keeping with an A-level course of study. Material used in the essay does not have to be taken from the specification, although it is likely that it will be. These notes must therefore be seen merely as guidelines providing an indication of areas of the specification from which suitable factual material might be drawn.

In determining the mark awarded for breadth, content should ideally be drawn from each of the areas specified if maximum credit is to be awarded. Where the content is drawn from two areas, two marks should be awarded and where it is taken only from a single area, one mark should be awarded. However, this should only serve as a guide. This list is not exhaustive and examiners should be prepared to offer credit for the incorporation of relevant material from other areas of study.