



EXAM PAPERS PRACTICE

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Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

2002

XVIII

1583

Time allowed
48 Minutes

Score

/40

Percentage

%

Biology

**AQA
AS & A LEVEL**

Mark Scheme

3.6 Organisms respond to changes in their internal and external environments (A-level only)

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- 1 (a) 1. (Seedlings) respond to light / are phototropic;
Reject: roots are positively phototropic / grow towards light

OR

Neutral: 'to control a variable'

2. (Only) measuring the effect of gravity / response to gravity;
Neutral: light affects growth / results

1

- (b) 1. (Cells in) root tip detect gravity / respond to gravity;
Must refer to root tip and not just the root

OR

2. IAA / auxin is produced in the root tip;

1

- (c) (i) 1. IAA / auxin moves to lower side / more IAA / auxin on lower side;
Accept: references to 'cell elongation' instead of 'growth'

2. Lower side grows less / slower / upper side grows more / faster /
 inhibits growth on lower side;

*Note: if auxin is placed at upper side, mark point 2 can still
 be awarded*

Need idea of 'less / slower' or 'more / faster' for mark point 2

2

- (ii) 1. Less IAA / auxin (produced);
2. Lower side grows more / faster / less inhibition of growth on lower
 side;
Must refer to the lower side

2

[6]

2 (a) Push – legume

Pull – grass;

Both needed for mark

1

(b) 1. Set up tape measures on two sides of the plot / make grid of plot;
Allow 'Number each plant'. With this approach mp3 cannot be awarded.

2. Use random number table / calculator / generator;
Allow 'Select from a hat' idea.

3. To generate coordinates;

3

- (c) 1. To prevent competition between the maize and the grass;
2. For light / nutrients / water;

OR

3. Idea of limits movement of pest (between grass and maize);
4. Only eating / damaging grass;

2 max

- (d) 1. Nitrogen-fixing bacteria convert nitrogen (in the air) into ammonium compounds (in the soil) which are converted into nitrates / nitrification occurs;

Accept 'ammonia' for 'ammonium compounds'.

2. Maize uses nitrates (in soil) for amino acid / protein / ATP / nucleotide production;

2. Must be in the context of maize.

Ignore ionic formulae unless only these are given.

2

- (e) 1. Reduced % damage to maize plants / increased maize grain yield;
2. Calculation to justify mp 1;
3. Standard deviation shows no overlap but need stats to show significance of this difference;
4. More profit / net income / greater income than additional cost (with push-pull);
5. \$322 extra / 408% more / \$401 v \$79 profit;

Accept '\$350 extra income compared to \$28 extra spend'.

Mp5 gains credit for both mp4 and 5

3 max

[11]

- 3 (a) Three changes described;;; *Neutral nucleus shrinks, since it doesn't*

Eg

1. Formation / growth of vacuole;
2. Formation of starch grains / amyloplasts;
2. Accept starch grains get bigger
3. Movement of grains / amyloplasts towards bottom of cell;
Note – list rule applies
4. Cells get longer / wider / larger;

3 max

- (b) 1. Grows sideways before starch grains form;
Q
2. Bending starts when / as grains form;
 3. More bending as grains increase in number;
3. Ignore starch grain growth references
 4. More elongation (of cells) / growth (of roots) downwards as starch grains increase / move;
 5. Bending starts before grains move down;
 6. Could be related to vacuole;
6. Ignore references to nucleus

3 max

- (c) 1. (IAA) at bottom of root / where IAA concentration high inhibits expansion / elongation (of cells);
2 and 3 need reference to expansion / elongation, not just growth
2. (IAA) at top of root / where IAA concentration low leads to expansion / elongation (of cells);
2. Accept less inhibition

2

[8]

4

(a) 1. (Taxis is) movement towards / away from a stimulus / a directional response / movement (to a stimulus);

2. (Move towards) temperature they were used to / cultured in;
Movement towards temperature they were used to = 2 marks

2 max

(b) 1. Hungry, so seeking food / in absence of food respond to temperature;
Ignore references to temperature and enzymes
Must be stated not inferred from other statements

2. Move towards temperature they were used to / cultured in;

3. Associate (this temperature) with food;
Accept they think food is here
Stated not inferred

4. (Then) stay in this temperature;

3 max

(c) 1. (Dim) worms live in soil / dark / affected by bright light / dim light is like normal environment / what they are used to;

2. (Even) because worms might move towards / away from bright light / to avoid creating light gradient / prevent worms showing phototaxis / all parts of surface exposed to same light;
Accept to avoid kinesis due to light

3. (Dim light) ensures heat from light not a variable / heat from lamp could kill / dry out worms;
Not just to control variables / factors

2 max

[7]



- 5 (a) 1. Similarity – directional response (to a stimulus) / movement towards / away from a stimulus;
2. Difference – taxis (whole) organism moves and tropism a growth (response).
Must be clear which one, taxis or tropism, they are referring to
Taxis occurs in animals / motile organisms and tropism occurs in plants

2

- (b) 1. Grow in direction of / towards (pull of) gravity;
Accept: tropism for growth
Ignore: pulled by gravity
Accept: positively geotropic / gravitropic
2. Grow away from salt;
Accept: negatively chemotropic / halotropic
1 and 2. Ignore: references to bends / moves
3. Salt has more effect (than gravity).
Accept: converse statement for gravity
Note: all three points may appear in one sentence

3

- (c) 1. More carriers in (cell) **L** / lower in **R**;
*Accept: left for **L** and right for **R** / side nearer salt for **L***
2. (So) less IAA in (cell) **L** / more IAA in (cell) **R**;
*Accept: more IAA moves out of **L** / less IAA moves out of **R***
3. (So) more (elongation) growth in **L** / less (elongation) growth in **R**.
*Accept: less inhibition of growth in **L** / more inhibition of growth in **R**;*

3

[8]