



EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

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
49 Minutes

Score

/41

Percentage

%

Biology

**AQA
AS & A LEVEL**

Mark Scheme

3.3 Organisms exchange substances with their environment



- 1 (a) 1. Lower affinity for oxygen / releases more oxygen / oxygen is released quicker / oxygen dissociates / unloads more readily;

Q Neutral: the organism / body has a lower affinity for oxygen / releases more oxygen

2. (To) muscles / tissues / cells

3. (For) high / rapid respiration;

Q Reject: 'produces more energy' on its own

Neutral: reference to partial pressure

Accept: (for) respiration to produce more energy in the form of ATP / release more energy

3

- (b) (i) 1. Small SA:VOL;
Neutral: small limbs / small ears / extremities
Neutral: small SA
Accept: large VOL:SA
Neutral: reference to fat / blubber / insulation

2. (So) reduces heat loss / (more) heat retained;
Note: MP2 is independent of MP1

2

- (ii) 1. Brain is the same, others fall;
Note: 1. might not be given in the same sentence
Assume that 'other organs fall' = all three organ categories fall

Accept: 'blood flow is reduced to all organs except for the brain'

2. Brain controls other organs / remains active / needs constant supply of oxygen;

Accept: 'seal would die' = brain remains active

3. Lungs not used / are used less / seal is not breathing / heart rate decreases / heart pumps less / blood diverted to muscles;

Reject: seal is not respiring

3

[8]

- 2 (a) 1. Trachea and bronchi and bronchioles;
2. Down pressure gradient;
3. Down diffusion gradient;
4. Across alveolar epithelium.
Capillary wall neutral
5. Across capillary endothelium / epithelium. 4 max
- (b) (About) 80.0%. 1
- (c) 1. (Group **B** because) breathe out as quickly as healthy / have similar FEV to group **A**;
2. So bronchioles not affected;
3. FVC reduced / total volume breathed out reduced.
Allow this marking point for group C 3
- 3 (a) 1. Water potential becomes lower / becomes more negative (as sugar enters phloem);
2. Water enters phloem by osmosis;
3. Increased volume (of water) causes increased pressure. 3
- (b) 1. Rate of photosynthesis related to rate of sucrose production;
2. Rate of translocation higher when sucrose concentration is higher. 2
- (c) 1. Rate of translocation does not fall to zero / translocation still occurs after 120 minutes;
2. But sucrose no longer able to enter cytoplasm of phloem cells. 2

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- 4 (a) 1. Contraction of internal intercostal muscles;
2. Relaxation of diaphragm muscles / of external intercostal muscles;
3. Causes decrease in volume of chest / thoracic cavity;
4. Air pushed down pressure gradient. 4
- (b) 19(%) 1
- (c) 1. Muscle walls of bronchi / bronchioles contract;
2. Walls of bronchi / bronchioles secrete more mucus;
3. Diameter of airways reduced;
4. (Therefore) flow of air reduced. 4
- [9]
- 5 (a) 1. (Overall) outward pressure of 3.2 kPa; 2. Forces small molecules out of capillary. 2
- (b) Loss of water / loss of fluid / friction (against capillary lining). 1
- (c) 1. High blood pressure = high hydrostatic pressure;
2. Increases outward pressure from (arterial) end of capillary / reduces inward pressure at (venule) end of capillary;
3. (So) more tissue fluid formed / less tissue fluid is reabsorbed.
Allow lymph system not able to drain tissues fast enough 3
- (d) 1. Water has left the capillary;
2. Proteins (in blood) too large to leave capillary;
3. Increasing / giving higher concentration of blood proteins (and thus wp). 3
- [9]