Practice Question Set For GCSE
Subject : Biology
Paper-1 Topic: B4 Bioenergetics

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Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

Level 3: Relevant points (factors / effects) are identified, given in detail and logically linked to form a clear account.

5–6

Level 2: Relevant points (factors / effects) are identified and there are attempts at logical linking. The resulting account is not fully clear.

3–4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1–2

No relevant content

0

Indicative content

causes of angina / CHD:

- high cholesterol / fat (in blood / diet), obesity
- a lack of exercise
- smoking / alcohol
- increasing age
- a family history of atherosclerosis or heart problems

explanation of symptoms:

- fatty deposits in coronary arteries
- narrowing of the coronary arteries
- reduced blood / oxygen / glucose to the heart (muscle / tissue / cells)
- reduced blood / oxygen / glucose to the body
- less oxygen / glucose for respiration
- less energy released
- (more) anaerobic respiration
- lactic acid formed
- muscle fatigue

treatment using GTN:

- more blood to the heart (muscle / tissue / cells)
- more oxygen / glucose to the heart (muscle / tissue / cells)
- increased (aerobic) respiration

For **Level 1** explanation(s) of the symptoms of angina **or** the treatment using GTN must be included

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For **Level 3** explanations must include the causes of angina, explanations of the symptoms of angina and treatment using GTN

[6]

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Q2.

(a) the interaction of (a community of living) organisms and (the non-living parts of) their environment / habitat

allow the interaction of (a community of) biotic parts and the abiotic parts of their environment / habitat

allow the interaction of a community and (the non-living parts of) their environment / habitat

1

(b) any **two** from:

- may be a predator therefore control prey population

  allow named examples throughout

  allow may be predator so keep prey population (fairly) constant

- may be prey so provide energy to predator

  ignore may be prey so provide food to predator

- may be a primary consumer therefore control plant / algae population
- may alter habitat for other species (to survive)
- may provide shelter for other species (to survive)
- may maintain biodiversity
- may disperse seed / pollen

2

(c) $(\frac{216}{4} =) 54$

allow $(\frac{216\,000}{4000} =) 54$

1

(d) as number of bacteria increases, the concentration of dissolved oxygen decreases

ignore references to inversely proportional

allow as bacteria increases, oxygen decreases

allow there is a negative correlation

allow converse

1

(the relationship is)
not number of bacteria increases and the concentration of oxygen increases (in the same ratio)

*allow (the relationship is) **not** as bacteria increases, oxygen increases*

allow whereas proportional (relationship) would mean as one increases the other increases (in the same ratio)

allow converse

1

(e) (decrease in oxygen concentration causes a) decrease in the number of fish

allow (decrease in oxygen concentration means) more fish die

1

(because) fish need oxygen to respire (aerobically)

*allow invertebrates need oxygen to respire **and** fish eat invertebrates*

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*do **not** accept implications that otters require oxygen from water*
*do **not** accept energy produced / made / created by respiration*

1

(therefore) otter population decreases due to less food

allow rate of reproduction (in otter population) is lower due to less food
allow otters migrate to another river / area / habitat
ignore decrease in oxygen causes decrease in otter population
unqualified

alternative answer
(decrease in oxygen concentration means) more bacteria are present (1)

(so) more fish die (from bacterial infection) (1)

(therefore) otter population decreases due to less food
or
rate of reproduction (in otter population) is lower due to less food
or
otters migrate to another river / area / habitat (1)

1

[9]

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Q3.

Level 3: Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.

5-6

Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

3-4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1-2

No relevant content

0

Indicative content

Bright light:
- rate of photosynthesis is high due to high light intensity
- (extra) carbon dioxide is absorbed from the air
- (so) oxygen is released into the air
- carbon dioxide produced in respiration is used for photosynthesis
- (so) no carbon dioxide released from plant **or** into the air
- sufficient oxygen for respiration is produced by photosynthesis
- (so) no extra oxygen absorbed from the air
- rate of photosynthesis is greater than rate of respiration

Dim light:
- no net / overall flow / exchange of carbon dioxide or oxygen with the air
- (because) rate of respiration equals rate of photosynthesis
- carbon dioxide produced in respiration is used for photosynthesis
- no (extra) carbon dioxide is absorbed from the air
- oxygen produced by photosynthesis is used in respiration
- no (extra) oxygen is absorbed from the air

No light:
- no photosynthesis occurs as no light
- (so) no carbon dioxide is absorbed and no oxygen released / produced
- plant respires so takes in oxygen and releases carbon dioxide into the air

General points:
- plants photosynthesise when there is light using carbon dioxide and producing oxygen
- rate of photosynthesis depends on light intensity
- respiration occurs at all times of the day
- respiration uses oxygen and produces carbon dioxide

Level 3 response must include explanation at all three light intensities, demonstrating a good understanding of both photosynthesis **and** respiration.

For **Level 2** correct reference to **both** processes **and** to **both** gases

[6]

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