Mark schemes

Q1.

(a) Correct answer of 5 / 5.4 / 5.44 × 10^{-2} = **2 marks**;;

Incorrect answer but shows 5 / 54 / 544 (ignore position of any decimal point or preceding/subsequent zeros) = **1 mark**;

*10^{-2} is essential for **two marks**.*

2

(b) H-zone decreases, I-band decreases, A-band no change;

1

(c) 1. Fast (fibres) contract quickly whereas slow (fibres) contract slowly

OR

Fast (fibres) used for short time whereas slow(fibres) used for long time;

*Accept fast contract quicker **OR** slow contract slower **OR** fast used for shorter time **OR** slow used for longer time.*

Accept examples of short-time / power exercise e.g., sprinting, weightlifting and long-time exercise e.g., marathon, endurance.

2. Fast (fibres mainly) use anaerobic respiration

OR

Slow (fibres) use aerobic respiration;

3. Fast (fibres) produce ATP quickly

OR

Slow (fibres) produce ATP slowly

OR

Less ATP/energy (per glucose) from anaerobic respiration

OR

More ATP/energy (per glucose) from aerobic respiration;

Accept 'release energy' for 'produce ATP' in first and second statements.

Reject 'produce energy'.

Ignore number of ATP molecules produced but comparison must be correct.

4. Glycogen is a store of glucose

OR

Glycogen hydrolysed to glucose

OR

Glycogenolysis;

4

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Q2.

(a) 1. To break actinomyosin (bridges);

Accept 'to form actinomyosin'.

Accept 'to detach or attach myosin and actin'.

Reject reference to 'active site'.

2. To move/bend the myosin head/arm;

Accept 'to change shape of myosin head/arm'.

Accept ADP/Pi moves (myosin) head/arm.

Accept powerstroke/pivot /recocks etc. for movement.

3. (So) actin (filaments) are moved (inwards);

Ignore 'sliding'.

4. For active transport of calcium ions (into the sarcoplasmic/endoplasmic reticulum);

2 max

(b) 1.35

OR

1.4;

Accept numbers after 1.35.

1

(c) 1. Fast (skeletal muscle) fibres used during short-term/intense exercise;

1 and 2 Accept examples of short-term/intensity exercise e.g. sprint and longer-term/endurance exercise, e.g. marathon or low(er) intensity exercise.

Accept fast twitch fibres for fast (skeletal muscle) fibres

2. Slow (skeletal muscle) fibres used during long(er)-term exercise;

Accept slow twitch fibres for slow (skeletal muscle) fibres.

3. Creatine used to form phosphocreatine;

4. (Phosphocreatine) combines with ADP to form ATP;

5. (Carbohydrate/glucose) stored as glycogen

OR

Glycogenesis;

6. Glycogen hydrolysed to glucose

OR

Glycogenolysis;

7. Glucose for respiration;

Accept glycolysis for respiration.

Max 3 marks from mark points 3, 4, 5, 6 and 7.

5 max

(d) 1. (More) glucose enters (muscle) cells;

Ignore more glucose leaves (liver) cells.

Reject glucose enters mitochondria.

2. (Glucose/fatty acids enter by) facilitated diffusion;

Accept active transport or cotransport.

3. Fatty acids used in Krebs cycle;

Ignore gluconeogenesis.

4. Respiration provides (more) ATP;

Accept in context of glucose or fatty acids.

Accept for fatty acids 'Krebs cycle produces ATP'.

Max 2 marks if only in context of glucose or only in context of fatty acids.

3 max

(e) 1. Increase in CO_2 detected by chemoreceptors;

Accept increase in acidity/H^+ or decrease in pH for increase in CO2.

Ignore location of chemoreceptors.

2. Send (more) impulses to cardiac centre

OR

Send (more) impulses to the medulla;

2 and 3 Reject reference to 'an/one impulse' once only.

2 and 3 Reject 'signals', 'messages' for 'impulses' once only.

2 and 3 Accept 'action potentials' for impulses.

3. More impulses (from centre/medulla) along sympathetic pathway/neurones/nerves

OR

Fewer impulses (from centre/medulla) along parasympathetic/vagus pathway/neurones /nerves;

4. (To) SAN;

4

[15]