Annotated Short Answers

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Please note that this paper can be used by teaching staff as a teaching resource provided that acknowledgement is given. It can also be used by students as a self-study tool; however, the text cannot be copied and used in students’ assignments. Copyright for the original assignment texts remains with the students who wrote them.
Briefly explain why Type 1 muscle fibres are better suited for aerobic/endurance type activities. You MUST use at least five different characteristics of Type 1 muscle fibres to justify your answer. (10 marks)

**Answer A**

Type I muscle fibres are better suited for aerobic/endurance types of activities because they support oxygen and energy provision to the body better than Type II muscle fibres. The first advantage of Type I muscle fibres is their large myoglobin content, which is a protein in the muscles that binds to oxygen. Aerobic exercise requires oxygen and the myoglobin [to] carry the necessary oxygen. The second advantage is the large number of capillaries. These tiny blood vessels provide oxygen and nutrients from the blood that are needed while exercising. The third advantage is the large number of mitochondria, which produce the energy to continue exercising. Because of the higher mitochondria content, the fourth advantage is a high capability to produce ATP, one of the energy sources muscles can use during exercise. The fifth advantage is a high resistance to fatigue, which is necessary when exercising for longer periods of time. All these characteristics of Type I muscle fibres promote the required substances to the muscle in order to maintain activity for long periods of time.
**Answer B**

Slow twitch, Type I muscle fibers comprise 50% of the total fibers present in skeletal muscle and are best suited for aerobic, endurance activities. There are five major characteristics attributable to Type I muscle fibers that make them better suited to such activities. One such characteristic is the high ATP production ability of these fibers. If Type I fibers can produce large amounts of ATP, they have sufficient energy to sustain their work over long periods of time. Along the same lines, Type I muscle fibers have high fatigue resistance, meaning they do not get tired as easily as Type II fibers. This sustains their ability to maintain work rates required by the body.

Likewise, a good oxygen supply is key to skeletal muscle’s ability to sustain workloads. Three factors that boost oxygen supply in Type I fibers are having a high number of mitochondria, many capillaries and large myoglobin content. Having a high number of mitochondria is beneficial as this is the site of aerobic ATP production, meaning Type I fibers will therefore have ample supply of ATP. In addition to this, having many capillaries provides an ample blood supply in which to transport vital oxygen and nutrients to exercising muscle. Having a large myoglobin content also increases oxygen supply to the exercising muscle. Myoglobin is an oxygen-binding protein of skeletal and heart muscle so having abundant amounts of this protein means that Type I fibers will have the necessary oxygen needed to respire aerobically.
Briefly answer the following question:

What is Type II diabetes and how is it different from Type I diabetes? (2 marks)

Answer A

Type II diabetes is a resistance to insulin that develops as a result of an excess of fat. Because the body resists insulin, glucose in the blood from ingested food is unable to cross the cell membrane. It [insulin] gathers in the blood, increasing blood glucose levels. Type II diabetes is an issue of insulin resistance, but Type I is a lack of insulin production. It is not caused by a lack of exercise or eating [an] excess amount of fat like Type II is, but Type I diabetes is an auto-immune disorder.

Answer B

Type II diabetes is a chronic disease that occurs in response to excess fat build up in cells, which leaves body cells resistant to insulin. Type II diabetes is characterized by a blood glucose level greater than 7 mmol L⁻¹, (after an 8 hour fast). In Type II diabetes, the pancreas still produces insulin[;] however, in Type I diabetes, the liver no longer produces any insulin at all (although body cells are still sensitive to it when it is injected).
Short answer questions from Sports Science

Requirements of short answer questions
Short answer questions require brief, concise, and specific answers that address each component of a given question. The number of marks allocated to a question gives an indication of the expected length and depth of a response.

Since marks are assigned to measure the ability to demonstrate a clear understanding of the topic addressed by a question, factual answers are required. Unlike essay writing, therefore, it is not necessary to use tentative language (e.g., "This perhaps indicates...") or to make strong claims (e.g., "This undoubtedly shows...").

Reference to the literature
Another difference of short answer questions to essay writing, is that no reference is made to the literature. Marks are allocated according to a student’s ability to demonstrate his/her knowledge of the subject. In order for a student to produce a well-written answer, s/he would have clearly needed to refer to reputable literature.

Tense use
The present simple tense is used in answers to short answer questions as this refers to generally accepted ideas and principles; e.g., "There are five major characteristics attributable to Type I muscle fibers that make them better suited to such activities."

Modal verbs
Modal verbs are occasionally used to express, for example, ability or possibility: "If Type I fibers can produce large amounts of ATP, they have sufficient energy to sustain their work over long periods of time."

Active and passive voice
The active voice is most often used as this focuses on who did the action (the agent); e.g., "Aerobic exercise requires oxygen and the myoglobin [to] carry the necessary oxygen." Very occasionally the passive voice is used when the writer wishes to focus on the happening described in the verb (the action); e.g., "Type II diabetes is characterized by a blood glucose level greater than 7 mmol L-1, (after an 8 hour fast)."

Reduced relative clauses
Reduced relative clauses are sometimes used to keep answers brief; e.g., "Type I fibers will have the necessary oxygen needed to respire aerobically." If this clause was written in full, it would include the words "that is"; i.e., "Type I fibers will have the necessary oxygen that is needed to respire aerobically."

Coherent and well-structured answers
An important feature of well-written answers to short answer questions is that they are coherent, and each idea is clearly linked to the one that precedes and follows it. Writers can create a coherent text by giving careful consideration to the overall structure of their answer and the logical connection of ideas within it. First, the answer needs to be well-structured. Questions that are worth more marks are likely to require longer answers. Such answers may, therefore, begin with an introductory sentence in which an overall answer to the question is given. The introduction is followed by the ‘body’ of the answer which contains the details of the argument. Then, the answer ends with a concluding sentence which sums up what has been discussed. Questions that are worth less marks are likely to require shorter answers. In these, the first sentence (or two) is likely to answer the first half of the question and the last sentence (or two), the latter part of the question.

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Using sentence connectors to make logical connections
In addition to considering the overall structure of the answer, the writer needs to consider the logical connection of ideas within it. A variety of strategies can be used to ensure a smooth flow of ideas. One is to use “signposting” where the writer gives an indication of what is to be discussed (e.g., “There are five major characteristics attributable to Type I muscle fibers that make them better suited to such activities. One such characteristic…”). Another method of achieving coherence is to use transition signals; e.g., In addition, furthermore, however. A further way is to use a pronoun (e.g., “Type II diabetes is an issue of insulin resistance, but Type I is a lack of insulin production. It is not caused by a lack of exercise or eating”). If you use pronouns, however, check that its meaning is clear. Otherwise, it is preferable to repeat the noun or use a synonym or a noun phrase (e.g., ”The second advantage is the large number of capillaries. These tiny blood vessels…”).

Academic and specialised vocabulary
Another feature of well-written answers to short answer questions is that they use academic and specialised vocabulary. Using academic vocabulary means that there are no phrasal verbs (e.g., make up, think about), contractions (e.g., can’t, haven’t) or colloquial language (e.g., guys, things).

Drawing upon specialised vocabulary from the particular course is also a feature of short answer questions; (e.g., ”The word pancreas is defined in the Oxford Advanced Learners’ Dictionary as ‘an organ near the stomach that produces insulin and a liquid that helps the body to digest food’”). To use specialised vocabulary well, it is important to use the word’s correct form (e.g., ‘mitochondria’ is the plural form of ‘mitochondrion’ and ‘capillaries’ the plural form of ‘capillary’) and use the word in an appropriate collocation; that is, with words that frequently combine together (e.g., ‘chronic disease’ NOT ‘continuing disease’ or ‘lasting disease’). Given the importance of correctly using specialised vocabulary, you may find it useful to build a glossary and focus on learning these words so that you are familiar with their meaning, the words they collocate with, and the various forms of the word.