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## Answers

# Exam-style questions

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Check your answers to the questions in this issue.

## Exam focus: Aerobic energy systems (p. 8)

1 AO1 knowledge of Krebs cycle to include points such as:

- Occurs in the matrix of the mitochondria.
- Each acetyl group combines with oxaloacetic acid, to form citric acid.
- The carbon in the acetyl groups is oxidised to form more carbon dioxide.
- Hydrogen is formed and taken to the electron transfer chain.

AO2 application of Krebs cycle to a team game: aerobic/low-medium intensity examples within a team game when Krebs cycle would be used, for example zone defence in basketball when the intensity is lower/in netball the GK marking the GS in the circle as the ball comes down court.

AO3 analysis of Krebs cycle in a team game:

- Aerobic system/Krebs cycle not the only energy system used. Team games especially basketball are not just one pace/level of intensity.
- Examples in the game where other energy systems are used to provide energy, for example as a basketball player jumps as high as they can for a rebound they need to supply energy as quickly as possible, so the main energy system used would be the ATP/PC system/full court press followed by a fast break is high intensity work and longer than 10 seconds so the anaerobic glycolytic system would be used more.

2 Fats cannot be broken-down anaerobically.

The use of fats for energy relies on adequate supplies of oxygen/fat breakdown requires more oxygen than is needed for glucose breakdown.

In the 100m, oxygen supply becomes a limiting factor, as the intensity is very high, so fat use is restricted.

Exercise at high intensity uses glucose as the main fuel source (because fat metabolism demands too much oxygen).

3 The breathlessness is EPOC.

EPOC is the higher than resting level of oxygen consumption.

The fast component of EPOC uses the extra oxygen to restore phosphocreatine.

Re-saturate myoglobin with oxygen.

The slower component of EPOC is the removal of lactic acid.

The slow component also used for other processes such as the extra oxygen needed by the breathing and heart muscles that are still recovering.

## Rehabilitation and recovery (p. 22)

Five marks from:

- Cold water immersion therapy (ice baths) should be taken immediately after competition.
- Ice baths should be taken for around 10 minutes at a water temperature of 14 degrees Celsius (or lower).
- Ice baths reduce the delayed onset of muscle soreness (DOMS).
- Studies have shown they can have a negative effect on protein synthesis (muscle-building).
- Ice baths are often expensive pieces of equipment.
- Ice baths require lots of space, and can be difficult for non-professional teams to obtain due to lack of funds/available space.
- Athletes may improvise ice baths, e.g. wheelie bins and paddling pools

## Rock climbing (p. 28)

**1** Isometric contractions take place then there is no change in muscle length. For example, the wrist flexors contract isometrically when gripping a hold in rock climbing.

Isotonic concentric contractions take place when the muscles shorten under tension. For example, the biceps brachii contract concentrically in the upward phase of a pull up.

Isotonic eccentric contractions take place when the muscle lengthens under tension. For example, the biceps brachii contract eccentrically in the downward phase of a pull up.

**2** Fast glycolytic fibres (Type IIb)

High levels of stored phosphagens

Large motor neurone size

Fast contraction speed

High force production

Very high anaerobic capacity

**3** Energy balance: excess body mass hinders performance, therefore energy intake  $\leq$  energy expenditure.

Nutritional aids e.g. caffeine: optimal stimulation vs loss of fine motor control.

Hydration: optimal hydration without excess weight.

**4** Acute injuries are caused by a sudden impact or stress upon on the body. For example, when falling off a wall a climber may land on their wrist and fracture it.

Chronic injuries are caused by repeated stress on the body over an extended period of time. For example, a climber who climbs too frequently and does not rest sufficiently may develop tendonitis or some form of repetitive strain injury.

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