



# Instructions

## Individual, exam-style questions

The questions contained in this booklet match the style of questions that are typically asked in exams. This booklet is not however, a practice exam. Elevate's research with top students identified that top students do more practice questions than anyone else. They begin the process of testing their knowledge early in the year.

Therefore, we have provided exam-format questions that are sorted by topic so that you can answer them as you learn the information, rather than waiting until the very end of the year to complete exams.

## Comments, questions?

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## Other information

Every effort has been made to ensure the accuracy of the information expressed in this booklet, but no warranty or fitness is implied. If you'd like to provide any feedback on this booklet, let us know at [admin@elevateeducation.com](mailto:admin@elevateeducation.com).

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# Skeletal Muscle Function and Structure

1. Complete the table below in relation to the properties of Type I and Type II (IIA and IIB) fibres along with each fibres fatigue rate and force generation. Provide a relevant sporting example for each.

Fibre Type	Force generated	Sporting Example
Type I		
Type II		

2. In relation to the sliding filament theory, which of the following statements is false?
  - a. During contraction, myosin cross-bridges extend forward to pull the actin filaments across
  - b. When fully contracted, the actin and myosin filaments overlap for up to 10% of their resting length
  - c. The shortening of the sarcomere results in the shortening of the muscle fibres
  - d. The sarcomere shortens, as actin filaments move to the centre
3. Identify the contractile proteins involved in the sliding filament theory and describe the role of the sarcomere in muscle contraction
4. Discuss how muscle force production is affected by slow, moderate and high velocity movements
5. Which statement is true in relation to force-length relationship in muscle contraction?
  - a. Shorter muscles with the largest cross-sectional area have the ability to create least force
  - b. Shorter, thinner muscles have the ability to move joints through a greater range of motion
  - c. Longer muscles with the largest cross sectional area have the ability to produce the least force
  - d. Longer, thinner muscles have the ability to move joints through a greater range of motion

6. Select the correct terms to complete the following description.

\_\_\_\_\_ is the fibrous sheath around an entire skeletal muscle and  
\_\_\_\_\_ is the sheath of connective tissue surrounding a bundle of muscle  
fibre

- a. Epimysium; perimysium
- b. Perimysium; endomysium
- c. Epimysium; endomysium
- d. Perimysium; neuron

7. Describe the relationship between muscle contraction and nerve function

8. Name and describe the two sub divisions of the neuromuscular system

9. What is the role of the motor neuron?

10. Explain the “All or Nothing” principle

11. Muscle fibres are one component of skeletal muscles. What is the role of the muscle fibres?

12. Actin and myosin filaments are extremely important for muscle contraction. Explain the role of each filament and the interaction it has in muscle contraction.

13. There are three types of muscle contractions. List each muscle contraction and briefly explain its role.

14. What is the difference between the origin and insertion point in muscle action?

15. How does the proportion of red versus white muscle fibres differ in individuals?

16. How does the percentage difference of one fibre to another in an individual affect their performance in different types of sporting activities? Explain.

17. In weight lifting and power sports, muscular strength is vital for peak performance. Summarise the factors that affect the amount of muscular strength performers are able to generate

## Bio-mechanical Principles

1. Within the coordination continuum, which of the following examples best represents simultaneous movement?

- a. Field hockey pass
- b. Limiting a heavy hit
- c. A soccer kick
- d. Swimmer diving from the starting blocks

2. List the factors that affect the Coefficient of Restitution rating of a rebounding object?

3. Which principle is utilised in the throwing of a boomerang?
  - a. Bernoulli's principle
  - b. Buoyancy principle
  - c. Optimum projection principle
  - d. Range of motion principle
4. Assuming angular momentum is fixed, describe two variables that limit the number of somersaults a diver can complete once airborne
5. List and describe the three types of levers
6. Identify the class of lever used when biceps work to flex the forearm
7. Describe muscle force at various velocities
8. Describe muscle force at various lengths
9. Describe Newton's Laws of Motions and provide an example of how each influences performance in your chosen sport
10. Explain the role of the muscles in the sprint start in relation to Newton's First Law of Motion
11. What is the conservation of angular momentum?
12. A baseball's flight pathway is affected if it is spinning. By using a labelled diagram, identify and explain the biomechanical principles that result in a deviation in its flight path.
13. Define elasticity and how it relates to the coefficient of restitution
14. Briefly describe 5 ways in which balance can be improved for a gymnast
15. Define friction and how it influences the two types of drags
16. Provide two examples of action-reaction forces described in Newton's Third Law
17. The centre of gravity of a body is defined as:
  - a. the point where mass is greater than weight
  - b. the point around which body volume is evenly distributed
  - c. the point around which mass is evenly distributed
  - d. the point where the centre of volume and centre of mass coincide
18. Explain why longer golf clubs are chosen when it is desired to hit the ball over a greater distance
19. Outline the factors that determine projectile motion using a relevant sports example of your choice, and describe how consideration of these factors could be used to maximise performance

20. Explain why the follow through is essential in striking activities such as field hockey or golf
21. Which is the most common lever found in the human body?
  - a. 1<sup>st</sup> class lever
  - b. 2<sup>nd</sup> class lever
  - c. 3<sup>rd</sup> class lever
  - d. 4<sup>th</sup> class lever
22. If a tennis player were to place 'topspin' on the tennis ball in order to get the ball over the net, explain the biomechanical concepts involved on the ball whilst in motion

## Psychological Strategies

1. Define imagery and the additional benefits for athletes using imagery
2. Provide an example of positive extrinsic motivation
3. Which of the following is necessary for athletes to achieve optimal performance?
  - a. No stress levels
  - b. Maximum levels of arousal
  - c. A balance between fatigue and stress
  - d. A balance between anxiety and arousal
4. Explain how arousal levels can affect performance, making reference to the inverted U hypothesis and by providing a diagram in your answer
5. Swimmers will often develop a routine such as shaking their limbs before competing. Explain how a routine can assist athlete performance.
6. Outline two visual signs that may indicate an athlete being under-aroused before competition
7. Name and describe a psychological strategy that an athlete might use to improve their performance
8. How could an athlete use personal relaxation strategies to manage arousal levels before, during and after performance?
9. How could a javelin thrower use imagery to increase self-confidence before, during and after performance?
10. Explain how goal setting can assist motivation throughout an athlete's season
11. Define Carron's Model of Group Cohesion
12. What are the factors that affect cohesion?

13. Define Social Loafing and the negative impact it can have on teams.
14. Explain four ways in which social loafing can be minimised
15. How can concentration affect sporting performance?
16. How can athletes improve their performance? Provide four examples.
17. Mental skills training is best applied at what stage during the season?
18. Christina has just competed in the 100 m sprint in front of her crowd. This is normally one of her top events and her performance is usually flawless. Public expectations of her were high. However, she stumbled in the first ten metres and nearly fell over. She is feeling nervous and her confidence has been shaken. She is anxious for her next event, the hurdles, which is one of her weakest. Discuss how Christina could apply four mental skills strategies to help her re-focus for the hurdles event which starts in fifteen minutes time.

## Nutritional Requirements

1. Which of the following dietary considerations would you be least likely to recommend to an athlete?
  - a. Having a high GI meal five hours before a football game (game duration – 2 hours)
  - b. Having a low GI meal two hours before an ironman event (event duration – 8 hours)
  - c. Drinking a high GI drink immediately after a game of hockey (game duration – 2 hours)
  - d. Eating a high GI snack immediately before a 200 metre sprint (event duration – 10 seconds)
2. Athletes will often consume high GI foods after training or competition. What would be an appropriate high GI snack to consume after training?
  - a. 1 cup of baked beans
  - b. 1 apple
  - c. 1 cup of watermelon
  - d. 1 cup of all bran
2. The Glycemic Index of foods is essential for the peak performance of athletes. Describe glycemic index and list two foods for each category of low, medium and high GI foods
3. Discuss the importance of macronutrients for athlete performance
4. Protein is important in the role of athlete recovery. Identify the role proteins play in

recovery and the recommended time period for consumption post-competition or training

5. Compare the dietary requirements of athletes in TWO sports that have different nutritional needs. Provide appropriate examples.
6. Explain how fluid loss can negatively impact sporting performance
7. The Rottneest Channel swim is a test for any endurance swimmer. The distance is 19.7 kilometres and takes over 5 hours to complete. Identify four nutritional requirements swimmers should take into account in the training phase (weeks prior to the event), two requirements in the pre-swim phase (two to four hours before the swim) and two requirements during the event itself. Recommend one suitable food that could be consumed in the hours before the swim and one that could be consumed during the swim.
8. What are the benefits of sports drinks?
10. Using a specific sporting example for each of the following, explain how an athlete's overall diet may vary from the recommended in the 'Australian Guidelines for Healthy Eating' for:
  - i) Carbohydrates
  - ii) Protein
  - iii) Total kilo joule intake
11. Considering energy depletion during a two-hour game of intense activity, how can these players make the best use of the Glycaemic Index food system to maximise their performance

## Evaluation of training programs

1. Give an example of one skill weakness and one physiological weakness that you observe from the video of your final half of the sport of your choice
2. Explain the reasons for changes in training load across the seven months of recovery, explaining particular cycles.
3. Netball teams will often enter competition phase. What training principle is best implemented during this phase?
  - a. Maintenance
  - b. Overtraining
  - c. Recovery



d. Progressive Overload

3. Define progressive overload and the benefit it would bring to an athlete in your chosen sport
5. Describe the difference between a macrocycle and microcycle of training in a scheduled program
6. Explain the purpose of pre-season, in-season and off-season. What are aspects that coaches should focus on during these periods?
7. Define the role of recovery in a training program. List two recovery techniques that a tennis player could employ after finishing their game.
9. What is periodisation? Discuss the different periods of periodisation.
10. List and describe the five health related components of fitness
11. List and explain the six performance/skill related components of fitness
12. An athlete will often aim to 'peak' at a competition. Explain the characteristics of peaking from a physiological, psychological and technical/tactical approach
13. Athletes will often overtrain in the lead up to major sporting tournaments. Define overtraining and its causes.
14. List the physiological, psychological and performance symptoms of overtraining
15. Physiologists will often prepare training programs for athletes which include a 'taper'. What is the purpose of tapering and when would the tapering period occur
16. What is DOMS and why is it caused?
17. A school soccer team undertakes a ten week training program prior to the national school championships. At the end of each training session the players were fatigued. The coach conducted a warm down activity. List specific actions, other than a warm down, the players could perform to ensure they recover as quickly as possible after each session.
18. What are 4 methods identified for coaches and athletes to prevent overtraining?
19. What are the core training principles?

19. What does duration mean and what must be considered?

## Energy Systems

1. Name the by-product of aerobic respiration
2. Describe the components of the ATP-PC energy system and when this system would be activated
3. What is the primary fuel used when the aerobic lipolysis energy system is activated?
4. What is an acute response to high-intensity exercise?
5. State the duration and fuel required for the anaerobic pathways
6. Provide three factors that affect the rate of fuel depletion during exercise for an
7. endurance runner who is completing an ultra-marathon
8. Explain, physiologically, how regular aerobic training leads to an increase in an athletes lactate threshold for a 400m sprinter
8. The most probable cause of fatigue for a runner in a 100m sprint is
  - a. Dehydration
  - b. Depletion of carbohydrates stores
  - c. Depletion of CP stores
  - d. Accumulation of hydrogen ions
9. When working at your lactate threshold, the major energy system being used is
  - a. ATP-PC
  - b. Aerobic lipolysis
  - c. Anaerobic glycolysis
  - d. Aerobic glycolysis

## Illegal and Legal performance enhancers

1. Russia has a strong history of top performing weight lifters. The aim of weight lifters is to increase muscle mass, and it is common for lifters to use a mix of dietary sports supplements and nutritional aids.
  - a. Name one legal nutritional supplement or aid that a lifter may use to increase power and explain how the supplement or aid may increase performance
2. The Australian Sports Anti-Doping Authority (ASADA) has removed a number of sports from the list of sports that prohibit the use of beta-blockers. Darts, archery, golf and aerial skiing are all sports that prohibit beta-blocker use in competition. Select one of the sports named above and explain why beta-blockers are still banned in that sport.
4. Other than promotion of muscle growth, identify and explain a physiological benefit of anabolic steroid use for a 100m sprinter
5. What are the negative side effects of anabolic steroid use for female athletes
6. Define the purpose of protein supplementation for athletes
6. Provide reasons as to why certain aids have been classified as illegal and prohibited in sporting use?
7. List three substances that are prohibited at all times for athletes
8. List three substances that are prohibited during competition only
9. Recent scandals of blood doping in cycling have just been discovered. Explain blood doping and describe two advantages and two disadvantages that can occur as a result.
10. Endurance runners will often 'carb load' before competitions. Explain carbohydrate loading and the benefits it may bring to athletes.
11. Caffeine stimulation is a technique used by many athletes from a variety of sports. What are the physiological advantages of caffeine on sporting performance?
12. Creatine supplementation is known to have several advantages for athletes. List and describe four of these advantages.
13. Part of the rationale for anti-doping codes is fairness. To uphold this rationale, which of the following World Anti-Doping Agency (WADA)

consider to be doping?

- a. Use of a pain-killing narcotic out of competition
- b. Use of a prohibited substance after obtaining a therapeutic-use certificate
- c. A missed in-competition test
- d. Possession of a permitted substance