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Sports, exercise and health science

Higher level

Paper 1A

28 April 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour 45 minutes [Paper 1A and Paper 1B]

Instructions to students

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- A calculator is required for this paper.
- A clean copy of the **SEHS data booklet** is required for this paper.
- The maximum mark for paper 1A is **[40 marks]**.
- The maximum mark for paper 1A and paper 1B is **[65 marks]**.

1. A change in blood pH from 7.4 to 7.3 is detected by chemoreceptors. Which are the locations of these receptors?

- I. Neck
- II. Aorta
- III. Inner ear

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

2. Which correctly characterizes the effects of testosterone?

	Bone mineral density	Protein synthesis	Erythropoietin production
A.	Increases	Decreases	Decreases
B.	Increases	Increases	Increases
C.	Decreases	Decreases	Decreases
D.	Decreases	Increases	Increases

3. Which correctly characterizes the effects of a regular aerobic exercise programme on maintaining blood glucose levels?

	Volume of insulin released	Glucose uptake into muscles	Plasma glucose concentration
A.	Less	Increases	Lowering slower
B.	More	Decreases	Lowering slower
C.	Less	Increases	Lowering faster
D.	More	Decreases	Lowering faster

4. After three weeks of training in the heat, a runner increases their time-to-exhaustion by > 20 %. Which is correct?

- A. The runner uses more muscle glycogen to maintain submaximal exercise as their metabolic rate increases.
- B. The runner does not increase their production of sweat due to an increase in core temperature.
- C. The runner sweats more due to a decreased stroke volume, resulting in an increased heart rate.
- D. The runner loses more heat through evaporation due to the production of more diluted sweat.

5. Which is a short-term response during a 14-day acclimatization period?

	% red blood cells within blood volume	Plasma volume	Red blood cell production
A.	Increases	Decreases	Increases
B.	Decreases	Decreases	Plateaus
C.	Increases	Increases	Plateaus
D.	Decreases	Increases	Increases

6. Which factor affects the tidal volume of an adult?

- A. Muscle mass
- B. Fitness level
- C. Body size
- D. Running economy

7. Which explains the role of the hypothalamus in regulating water balance?
- A. High electrolyte levels signal the hypothalamus to decrease thirst and increase water retention.
 - B. High electrolyte levels signal the hypothalamus to increase antidiuretic hormone (ADH) release and increase water retention.
 - C. Low electrolyte levels signal the hypothalamus to increase thirst and increase water excretion.
 - D. Low electrolyte levels signal the hypothalamus to increase antidiuretic hormone (ADH) release and increase water excretion.
8. Which apply to lipids?
- I. They can contain carbon double bonds.
 - II. They possess anti-inflammatory properties.
 - III. They can contain carbon, hydrogen, nitrogen and oxygen.
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
9. Which may have a negative impact on the gut microbiome?
- A. Dietary fibre
 - B. Polyphenols
 - C. Fermented foods
 - D. Meats and dairy

10. Which activity predominantly uses anaerobic glycolysis?

- A. Basketball rebound
- B. Taking a penalty kick
- C. 800 m running race
- D. 2 km rowing race

11. The running performance of two females was assessed during an aerobic capacity test. Both females had the same VO_2max (L min^{-1}) values. The data was converted relative to body size to provide a meaningful comparison between the individuals. Which is correct for a trained 60 kg female when compared to an untrained 70 kg female?

	Relative VO_2max ($\text{ml kg}^{-1} \text{min}^{-1}$)	Run to exhaustion time (min)
A.	Higher	Equal
B.	Equal	Longer
C.	Equal	Equal
D.	Higher	Longer

12. Which describes a mesocycle for a runner training for a marathon?

- A. The runner focuses on short bursts of speed training for five to seven days.
- B. The runner increases intensity of hill running for three to four weeks.
- C. The runner's training comprises several macrocycles.
- D. The runner incorporates mesocycles only during competitions.

- 13.** Which is a risk factor for osteoporosis?
- A. Early menopause caused by excessive exercise
 - B. A high body mass index (BMI) due to muscle hypertrophy
 - C. High dietary calcium intake during youth
 - D. An increase in weight-bearing exercise
- 14.** Which strategy reduces fatigue while exercising in high temperatures?
- A. Reduce sweat production and water loss by wearing dark-coloured clothing
 - B. Refuel with glycogen-dense foods, which are digested faster
 - C. Replace body fluids by consuming drinks composed of water and electrolytes
 - D. Remove breaks outside while exercising to decrease sun exposure
- 15.** Which reduces the presence of oxidants in the body?
- A. Carbohydrates
 - B. Protein
 - C. Lipids
 - D. Vitamins
- 16.** Which plane does shoulder abduction occur in?
- A. Sagittal
 - B. Transverse
 - C. Longitudinal
 - D. Frontal

17. Which describes motor unit recruitment?

- I. Smaller motor units are recruited first.
- II. Recruiting more motor units increases force production.
- III. Recruitment of motor units increases in the order: type IIx → type IIa → type I.

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

18. Hypocalcemia occurs when the level of calcium in the blood is too low. What is the effect of hypocalcemia on skeletal muscle contraction?

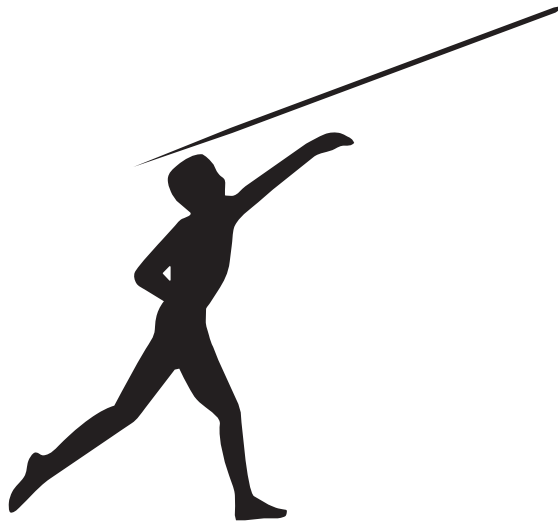
- A. The force will be low because the A-bands will not sufficiently shorten.
- B. The force will be high because myosin heads will remain attached to actin.
- C. The force will be low because only weak cross-bridges can form.
- D. The force will be high because more acetylcholine will be released.

19. Which of these activities represents a second-class lever?

- A. The neck when heading a ball
- B. The foot at take-off in long jump
- C. The elbow when throwing a javelin
- D. The knee when kicking a ball

20. A runner runs at a velocity of 10 km hr^{-1} . Over the next two hours, they accelerate by 1 km hr^{-2} . What is the runner's velocity after the two hours?
- A. 10 km hr^{-1}
 - B. 11 km hr^{-1}
 - C. 12 km hr^{-1}
 - D. 13 km hr^{-1}
21. A tennis player hits two identical tennis balls at different velocities. Which represents the coefficient of restitution (C_R) of both balls?
- A. The C_R of both balls is the same. C_R is determined by the size and volume of the balls that collide with the tennis racket.
 - B. The C_R of both balls is different. C_R is determined by the relative velocities of the balls when they collide with the tennis racket.
 - C. The C_R of both balls is different. C_R is determined by the material of the balls that collide with the tennis racket.
 - D. The C_R of both balls is the same. C_R is determined by the ratio of relative velocities of the balls, before and after collision with the tennis racket.
22. What does F_N represent in the equation $F_f = \mu_d F_N$?
- A. Dynamic friction
 - B. Normal reaction force
 - C. Surface drag force
 - D. The coefficient of friction
23. Which term represents the conversion of potential energy to kinetic energy when a stationary ball is kicked?
- A. Work
 - B. Power
 - C. Impulse
 - D. Speed

24. Which correctly identifies the factors affecting the horizontal distance of the flight path of a javelin **after** release?



	Initial velocity	Air resistance	Projection angle	Gravity
A.	No	No	No	Yes
B.	Yes	Yes	Yes	No
C.	No	Yes	No	Yes
D.	Yes	No	Yes	No

25. Which is an example of an athlete reducing wave drag?
- A. Keeping the head down and swimming underwater for as long as possible
 - B. Maintaining a streamlined entry during a platform dive
 - C. Shaving off body hair and wearing a sharkskin suit while swimming
 - D. A water skier applying wax to the bottom of their skis

- 26.** Which factor may help to reduce the occurrence of shin splints for a runner?
- A. Adding dynamic stretching to their warmup, targeting the hamstrings
 - B. Running at a faster pace fewer times per week, keeping rest days the same
 - C. Inserting orthotics into their shoes to raise the arches of the feet
 - D. Wearing appropriate clothing to more effectively maintain body temperature
- 27.** Which strategies could be used to decrease injury in young athletes?
- I. Adaptation of rules to meet developmental stages
 - II. Use of different sizes and materials for equipment
 - III. Incorporation of flexibility training into warmups
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
- 28.** Which is true about concussion recovery?
- A. Complete bed rest allows the brain to heal itself without expending extra energy.
 - B. Implementing cognitive games aids recovery by increasing brain blood flow.
 - C. Total recovery time for athletes injured in the same sport is consistent.
 - D. Return to competitive play is decided by the athlete based on their desire to play.
- 29.** Which is one of “the big five” personality traits?
- A. Loyalty
 - B. Openness
 - C. Dependability
 - D. Honesty

- 30.** Which applies to a novice athlete who learns a skill following observation, as stated in Bandura's social learning theory?
- A. Modelling
 - B. Motivation
 - C. Personality
 - D. Attitude
- 31.** Which is an environmental constraint while learning volleyball skills?
- A. Reducing the length of the court
 - B. Using smaller groups
 - C. Training while parents are watching
 - D. Arranging the players according to height
- 32.** Which describes the psychological refractory period?
- A. The brain processes tasks simultaneously rather than in a sequence.
 - B. It disregards cognitive processing and decision-making in the response.
 - C. Multiple channels process stimuli, removing delays when responding.
 - D. There is a delay measured in the response to a second stimulus.
- 33.** Which is an example of attentional narrowing in an athlete?
- A. The athlete ignores irrelevant cues due to decreased arousal.
 - B. The athlete ignores irrelevant cues due to increased arousal.
 - C. The athlete uses internal distractors to decrease arousal.
 - D. The athlete uses external distractors to increase arousal.

- 34.** An athlete cheats when they perceive that others doubt their talent. Which applies to the athlete?
- A. Low goal orientation
 - B. High goal orientation
 - C. High ego orientation
 - D. Low ego orientation
- 35.** Which are the basic psychological needs of self-determination theory?
- A. Competence, autonomy and relatedness
 - B. Achievement, competence and relatedness
 - C. Autonomy, independence and relatedness
 - D. Self-actualization, affiliation and achievement
- 36.** Which subtype of causal orientations theory is characterized by anxiety concerning competence?
- A. Introjected regulation
 - B. Identified regulation
 - C. Control orientation
 - D. Amotivation
- 37.** Which condition encourages a mastery motivational climate?
- A. Training
 - B. Audience
 - C. Recognition
 - D. Generalization

- 38.** An athlete's performance decreases dramatically and rapidly. Which is the most likely cause?
- A. Somatic anxiety is high and cognitive anxiety is low.
 - B. Somatic anxiety is low and cognitive anxiety is high.
 - C. Both somatic and cognitive anxiety are low.
 - D. Both somatic and cognitive anxiety are high.
- 39.** Which is an effective coping strategy for a novice athlete to reduce stress during competition?
- A. Physical withdrawal
 - B. Mental withdrawal
 - C. Effort expenditure
 - D. Emotional expenditure
- 40.** Which of Paivio's functions is influencing behaviour when an athlete mentally rehearses their football team's strategy?
- A. Motivational specific
 - B. Motivational general
 - C. Cognitive specific
 - D. Cognitive general
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