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Sports, exercise and health science

Standard level

Paper 1

25 April 2024

Zone A afternoon | Zone B afternoon | Zone C afternoon

45 minutes

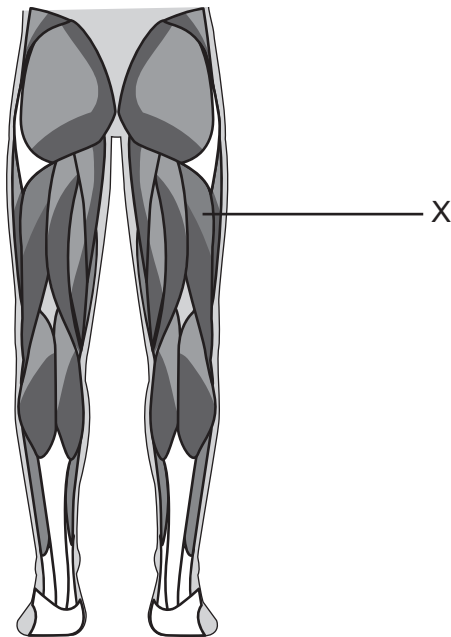
Instructions to candidates

- 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.
- The maximum mark for this examination paper is **[30 marks]**.

1. Which states the correct anatomical relationship among the bones of the hands and arms?
 - A. Phalanges are medial to the humerus.
 - B. Carpals are proximal to the ulna.
 - C. Humerus is distal to the metacarpals.
 - D. Ulna is medial to the radius.

2. What is the attachment of a muscle tendon to a stationary bone?
 - A. Insertion
 - B. Ligament
 - C. Origin
 - D. Synapse

3. The diagram shows a posterior view of the legs. Which skeletal muscle is labelled X?



- A. Biceps femoris
- B. Gastrocnemius
- C. Gluteus maximus
- D. Soleus

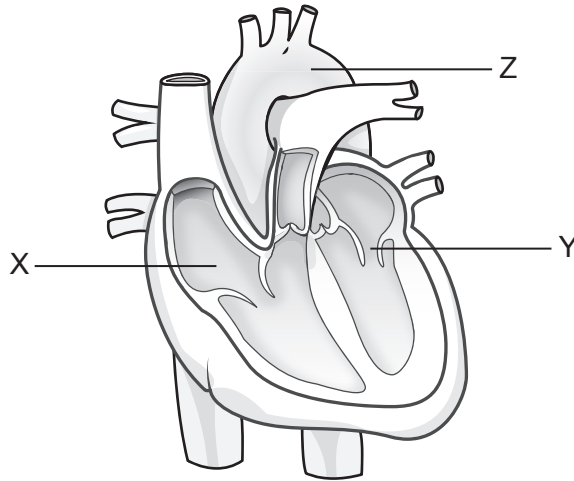
4. Which volume defines total lung capacity?
- A. Air in the lungs after a maximum inhalation
 - B. Air breathed in and out in any one breath
 - C. Air in excess of tidal volume that can be exhaled forcibly
 - D. Air still contained in the lungs after a maximal exhalation
5. Which correctly characterizes the relationship between blood acidity levels and ventilation during a sub-maximal training session?

	Blood acidity levels	Ventilation
A.	Rise (low pH)	Increases
B.	Low (normal pH)	Increases
C.	Rise (low pH)	Decreases
D.	Low (normal pH)	Decreases

6. Which option correctly identifies the function of each component of blood?

	Erythrocytes	Leucocytes	Platelets
A.	Repair injuries	Transport waste	Bind oxygen
B.	Bind oxygen	Fight infection	Repair injuries
C.	Fight infection	Bind oxygen	Transport waste
D.	Transport waste	Repair injuries	Fight infection

7. The diagram shows a cross-section of the heart. What are structures X, Y and Z?



	Structure X	Structure Y	Structure Z
A.	Right atrium	Pulmonary valve	Vena cava
B.	Left atrium	Pulmonary valve	Aorta
C.	Right atrium	Bicuspid valve	Aorta
D.	Left atrium	Bicuspid valve	Vena cava

8. Which is the correct sequence for excitation of the heart muscle?

- A. atrioventricular node → ventricles → sinoatrial node → atria
- B. sinoatrial node → atria → atrioventricular node → ventricles
- C. sinoatrial node → atria → ventricles → atrioventricular node
- D. ventricles → atrioventricular node → atria → sinoatrial node

9. Maximal oxygen consumption represents the functional capacity of the oxygen transport system. Which person would likely have the highest VO_2 max?

- A. Elite marathon runner
- B. Chess player
- C. Novice hiker
- D. Young weightlifter

10. Lipids are a macronutrient. Which are functions of lipids?
- I. To build hormones
 - II. To build muscle tissue
 - III. To store energy
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
11. Which characteristic distinguishes unsaturated fatty acids from saturated fatty acids?
- A. Ability to bond to glycerol
 - B. Composition of carbon, hydrogen and oxygen
 - C. Plant origin
 - D. Presence of double bonds between carbon atoms
12. Which option states the approximate energy content of 100g of protein?
- A. 100kJ
 - B. 1720kJ
 - C. 1760kJ
 - D. 4000kJ

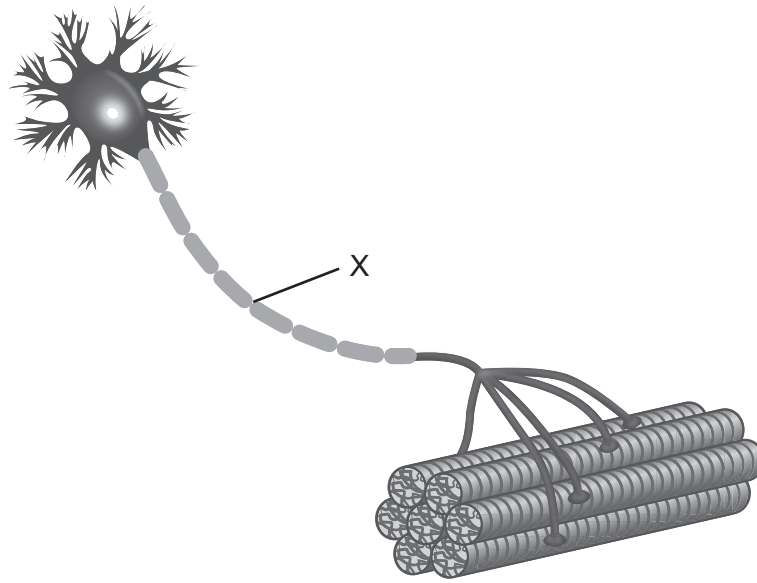
13. Insulin and muscle contraction influence glucose during exercise. Which combination correctly states how they influence glucose uptake?

	Insulin	Muscle contraction
A.	Stimulates	Stimulates
B.	Stimulates	Inhibits
C.	Inhibits	Stimulates
D.	Inhibits	Inhibits

14. Which processes require the presence of oxygen to produce adenosine triphosphate (ATP)?

- I. Glycolysis by the lactic acid system
 - II. Glycolysis followed by the Krebs cycle and electron transport chain
 - III. Beta oxidation of fatty acids followed by the Krebs cycle and electron transport chain
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

15. The diagram shows a motor unit. Which is X?

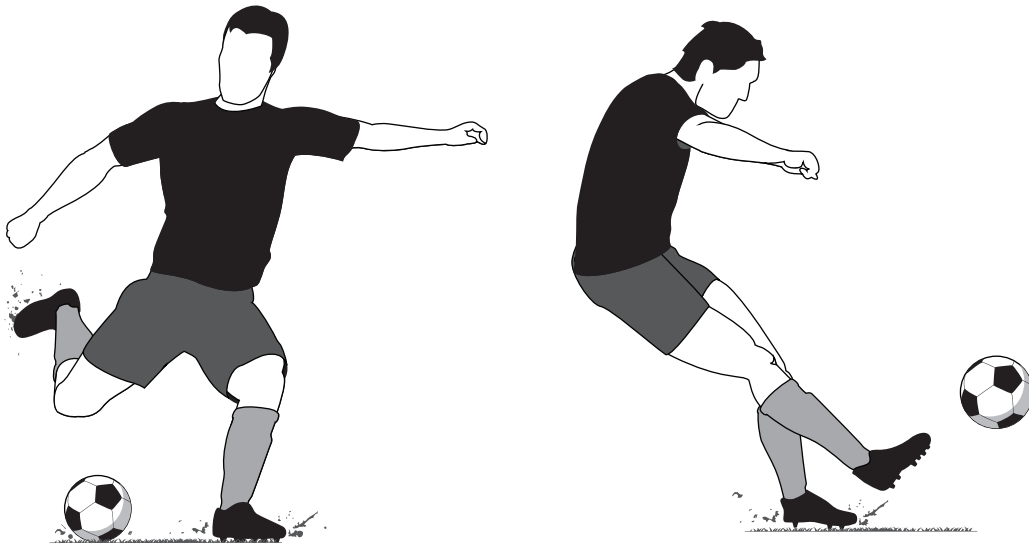


- A. Dendrite
- B. Motor end plate
- C. Axon
- D. Cell body

16. Which correctly identifies functions of slow twitch (type I) muscle fibres?

	Force generation	Durability
A.	Small	Maintain contractions for a long time
B.	Moderate	Fatigue quickly
C.	Large	Maintain contractions for a long time
D.	Small	Fatigue quickly

17. During a penalty kick in football (soccer), which type of movement and muscle contraction occurs at the knee and quadriceps?



	Type of movement	Muscle contraction
A.	Flexion	Concentric
B.	Extension	Concentric
C.	Flexion	Eccentric
D.	Extension	Eccentric

18. Which option is correct about delayed onset muscle soreness (DOMS)?

	DOMS is caused by	DOMS is minimized by
A.	Eccentric muscle contractions	Increasing the eccentric muscle contractions during early training
B.	Concentric muscle contractions	Starting training at a low intensity and gradually increasing the intensity
C.	Eccentric muscle contractions	Warming up before exercise
D.	Concentric muscle contractions	Cooling down after exercise

19. Which sporting action illustrates the performer's centre of mass temporarily outside the body?



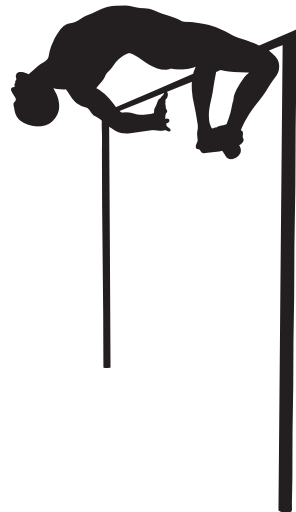
A. Sprint



B. Volleyball serve



C. Pirouette



D. High jump

20. A baseball pitcher applies the Bernoulli principle when throwing a curveball. Which option correctly identifies the cause and effect relationship the pitcher uses?

	Cause	Effect
A.	Region of high air pressure left of the ball	Ball curves to the right
B.	Region of low air pressure left of the ball	Ball curves to the right
C.	Region of high air pressure above the ball	Ball curves to the left
D.	Region of low air pressure above the ball	Ball curves to the left

21. When an ice skater performs a short routine, which option classifies their skills?

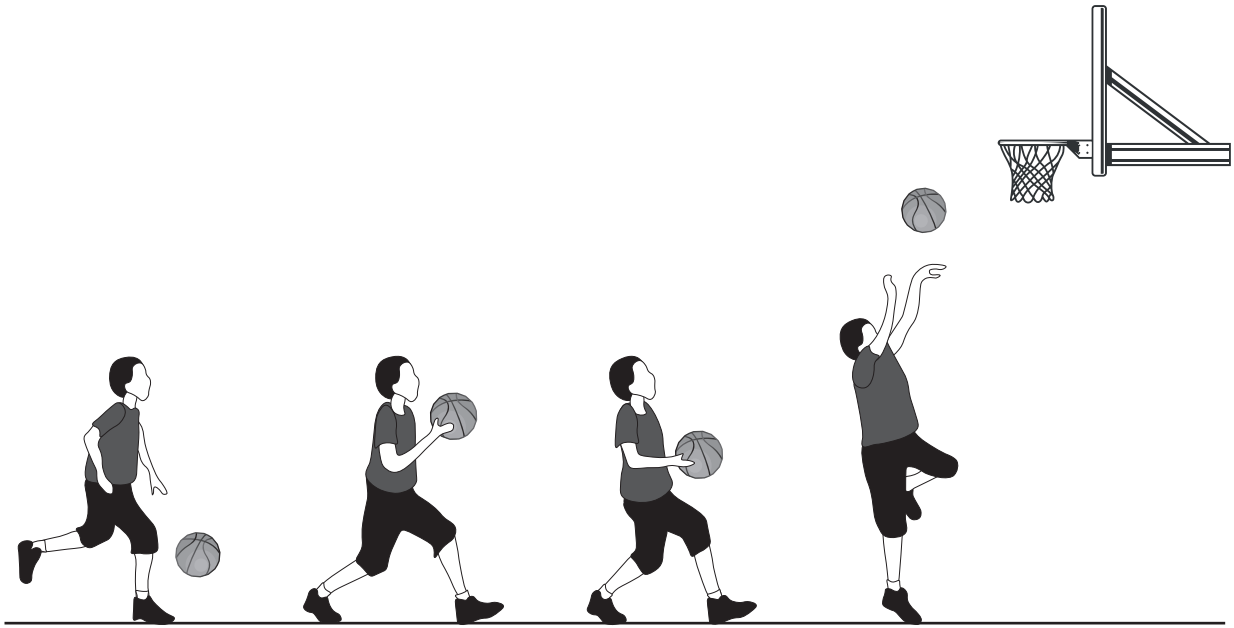
	Distinctiveness of movements	Stability of environment	Size of muscles involved
A.	Serial skills	Open skills	Fine motor skills
B.	Continuous skills	Closed skills	Gross motor skills
C.	Discrete skills	Open skills	Fine motor skills
D.	Serial skills	Closed skills	Gross motor skills

22. Which equation correctly relates ability, skill and technique?

- A. Ability = skill + selection of an appropriate technique
- B. Skill = ability + selection of an appropriate technique
- C. Technique = ability + skill
- D. Technique = ability – skill

- 23.** A gymnast performs a routine on the balance beam. Which type of sensor informs the gymnast about their joint movement and body position?
- A. Chemoreceptors
 - B. Exteroceptors
 - C. Interoceptors
 - D. Proprioceptors
- 24.** Swimmers perform a 200 m backstroke race. What types of feedback do they receive when they look at the clock at the end of the race?
- A. Intrinsic and concurrent
 - B. Extrinsic and concurrent
 - C. Intrinsic and terminal
 - D. Extrinsic and terminal
- 25.** An athlete acquires a new skill quickly and then their learning slows down. Which type of learning curve represents this?
- A. Linear
 - B. Negative acceleration
 - C. Positive acceleration
 - D. Plateau

26. The diagram shows how a layup is performed.



A basketball coach prepares to present learners with a layup practice. Which option justifies the coach's choice of presentation?

- A. Part – all of the components of a layup are performed at the same time
 - B. Part – the components of a layup are performed one after the other
 - C. Whole – all of the components of a layup are performed at the same time
 - D. Whole – the components of a layup are performed one after the other
27. A long jumper performs five jumps that are measured in metres of 5.0, 4.3, X, 5.7, 5.5. The mean is 5.0m. What is X?
- A. 4.3m
 - B. 4.5m
 - C. 5.0m
 - D. 5.3m

28. Which option is correct for a laboratory test of maximal oxygen consumption?

	Strength	Limitation
A.	Broadly accessible	Not reliable
B.	Accurate	Not broadly accessible
C.	Valid	Not accurate
D.	Reliable	Not valid

29. A trainer plans to test the effect of a weight training programme on a group of athletes. Which fitness test should the trainer use to assess power?

- A. Multistage fitness test
- B. Maximum push-ups
- C. Hand grip dynamometer
- D. Vertical jump

30. Which option states essential elements of a general training programme?

- A. A balanced diet and endurance training
 - B. Endurance training and regular medical check-ups
 - C. Regular medical check-ups and stretching activities
 - D. Endurance training and stretching activities
-

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