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Sports, exercise and health science
Higher level
Paper 1

Tuesday 4 May 2021 (morning)

1 hour

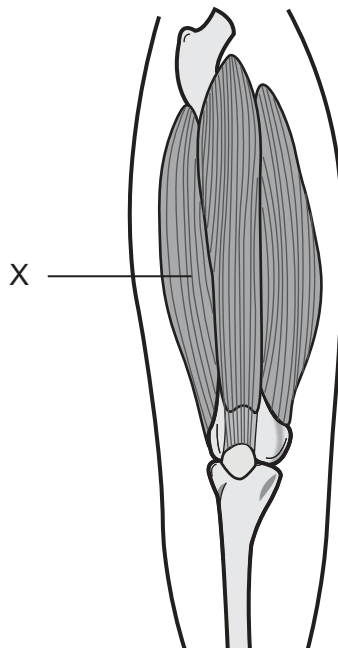
Instructions to candidates

- 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 **[40 marks]**.

1. Which bones of the vertebral column are fused?
 - A. Thoracic, sacral
 - B. Lumbar, coccyx
 - C. Sacral, coccyx
 - D. Thoracic, cervical

2. Which statement is correct about the insertion of a skeletal muscle?
 - A. The attachment of a muscle tendon to a moveable bone
 - B. The attachment of a muscle tendon to a stationary bone
 - C. The attachment of a muscle tendon at the proximal end
 - D. The attachment of a muscle tendon on the anterior aspect

3. The diagram shows the skeletal muscles in the anterior upper leg. Which muscle is labelled X?



- A. Rectus femoris
- B. Vastus medialis
- C. Sartorius
- D. Vastus lateralis

4. Which is a definition of vital capacity?
- A. Volume of air in the lungs after a maximum inhalation
 - B. Maximum volume of air that can be exhaled after a maximum inhalation
 - C. Volume of air in excess of tidal volume that can be forcibly exhaled
 - D. Volume of air breathed in and out in any one breath
5. What causes an increase in ventilation?
- A. A decrease in carbon dioxide content in the blood
 - B. A decrease in hydrogen ions in the blood
 - C. A decrease in blood pH
 - D. A decrease in blood acidity
6. What is the primary role of platelets?
- A. Supporting immune function
 - B. Carrying dissolved substances
 - C. Transporting oxygen
 - D. Blood clotting and preventing bleeding
7. What does systolic blood pressure measure?
- A. The force exerted on venous walls during atrial contraction
 - B. The force exerted on arterial walls during atrial contraction
 - C. The force exerted on venous walls during ventricular contraction
 - D. The force exerted on arterial walls during ventricular contraction

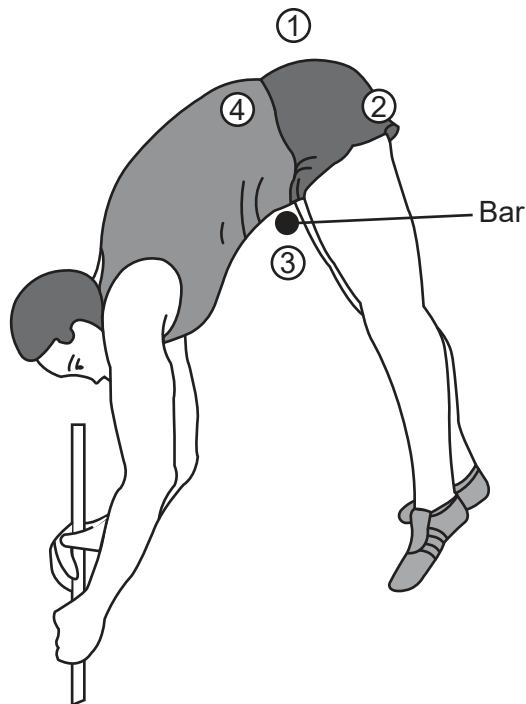
Turn over

8. How do glucose molecules combine to form a disaccharide?
- A. Condensation reaction
 - B. Catabolic reaction
 - C. Anaerobic catabolic reaction
 - D. Aerobic glycolysis
9. Which is a source of saturated fat?
- A. Palm oil
 - B. Olive oil
 - C. Sunflower oil
 - D. Canola (rapeseed) oil
10. What is a function of adrenaline?
- A. Increases stimulation of the parasympathetic nervous system
 - B. Increases heart rate
 - C. Decreases glycogenolysis
 - D. Decreases heart rate
11. What is the definition of cell respiration?
- A. The controlled release of energy in the form of adenosine triphosphate (ATP) from organic compounds in cells
 - B. The controlled release of energy in the form of adenosine diphosphate (ADP) from organic compounds in cells
 - C. The controlled release of energy in the form of glycogen from organic compounds in cells
 - D. The controlled release of energy in the form of carbon dioxide from organic compounds in cells

12. What shortens during muscular contraction according to the sliding filament theory?
- A. Z line
 - B. A band
 - C. H zone
 - D. Actin
13. What is an example of an isotonic eccentric contraction for the triceps?
- A. Lowering phase (elbow flexion) in a push-up
 - B. Lifting phase (elbow extension) in a push-up
 - C. Execution phase (elbow extension) when throwing a ball
 - D. Preparation phase (elbow flexion) when throwing a ball
14. Which term describes a scalar quantity?
- A. Acceleration
 - B. Distance
 - C. Displacement
 - D. Velocity

Turn over

15. The diagram shows a pole vaulter clearing the bar. Which number represents the correct position of the centre of mass?

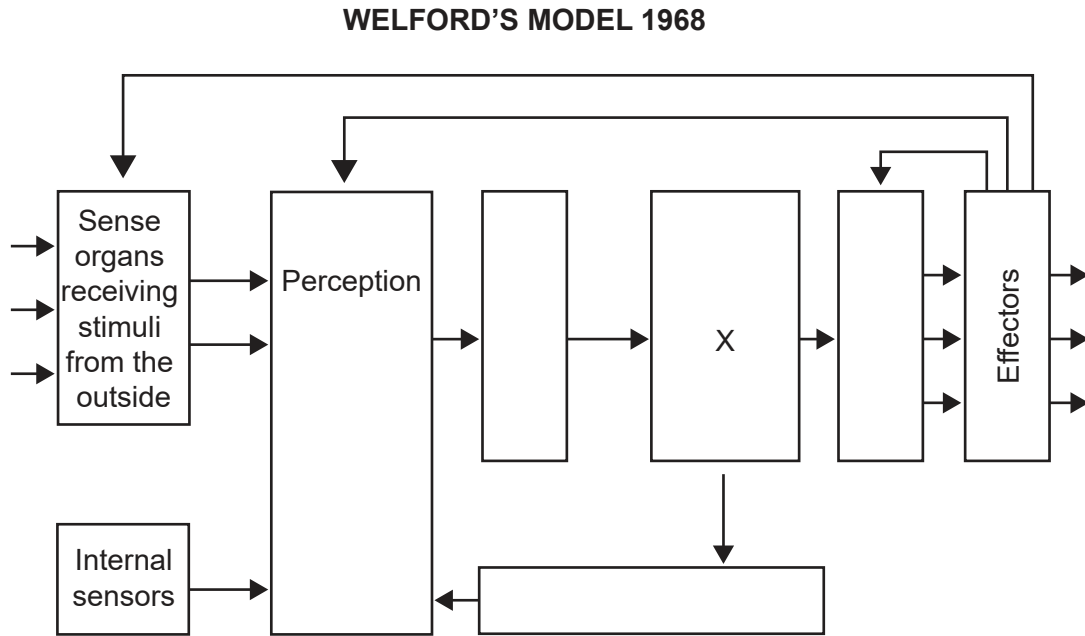


[Source: HAY JAMES G., THE BIOMECHANICS OF SPORTS TECHNIQUES, 4th Ed., ©1993 Reprinted by permission of Pearson Education, Inc.]

- A. 1
 - B. 2
 - C. 3
 - D. 4
16. What is an example of a first-class lever?
- A. Triceps contracting, moving the elbow
 - B. Biceps contracting, moving the elbow
 - C. Quadriceps contracting, moving the knee
 - D. Hamstrings contracting, moving the knee
17. What does ability refer to?
- A. The production of goal-orientated movements
 - B. The way in which a sports skill is performed

- C. A learned skill that is specific to the task
- D. The general trait or capacity of the individual

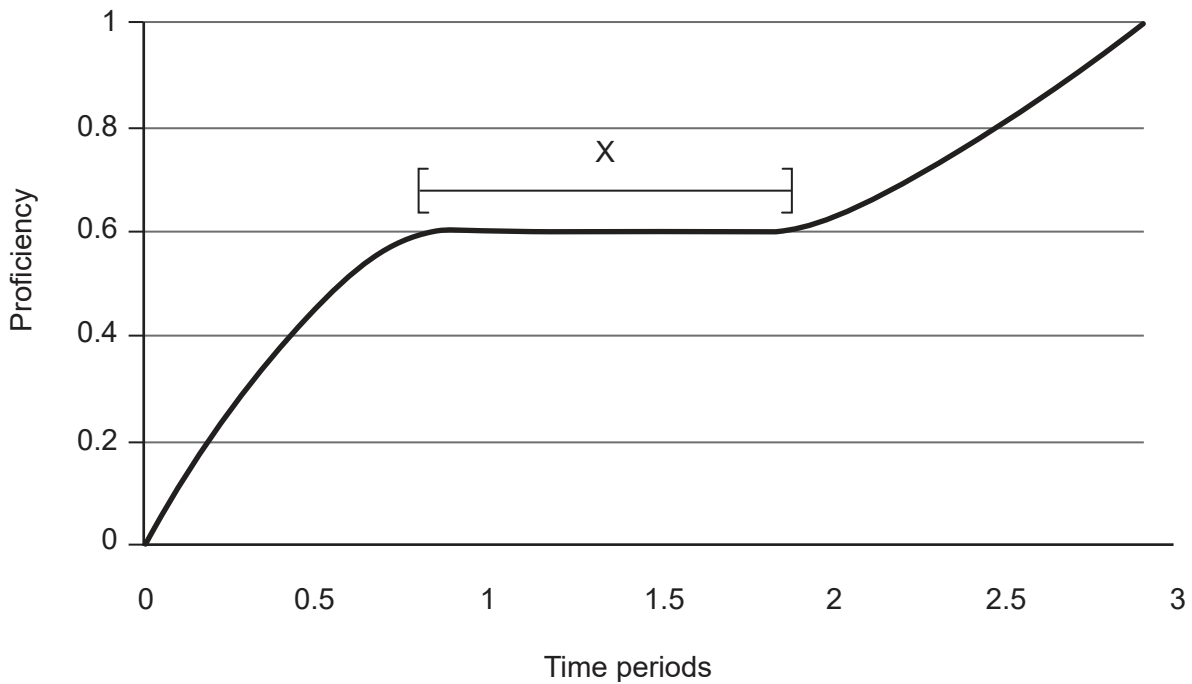
18. The diagram shows Welford's model of information processing. What does X represent?



- A. Short-term store
- B. Decision making
- C. Effector control
- D. Long-term store

Turn over

19. The diagram shows a learning curve. What type of learning is occurring during X?



- A. Plateau
 - B. Linear
 - C. Positive acceleration
 - D. Negative acceleration
20. Which describes practice to performance transfer in tennis?
- A. Hitting against a ball machine
 - B. Understanding the biomechanics of hitting
 - C. Training for strength to improve hitting
 - D. Hitting right-handed and left-handed
21. Which is an example of a reciprocal teaching style?
- A. The coach explicitly selects content and methods of what must be completed.
 - B. The coach sets the agenda and the athletes work in pairs to provide each other with feedback.
 - C. The coach sets a task for the athlete to solve.
 - D. The athletes coach themselves.

22. An athlete completed five timed trials of a 20 m sprint test. What is the mean time?

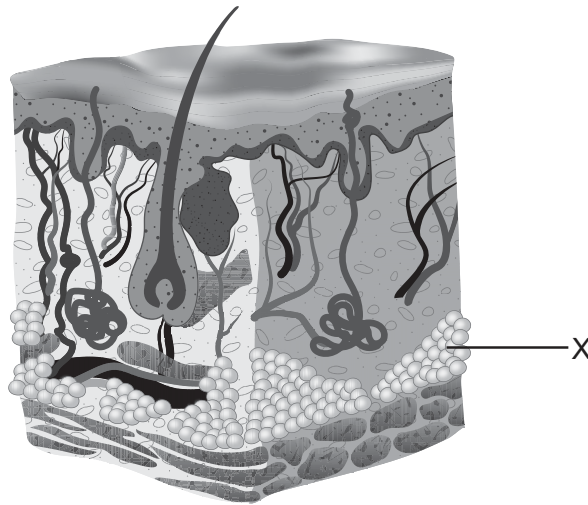
Trial	Time (s)
1	3.95
2	4.05
3	3.80
4	4.00
5	4.20

- A. 3.90 s
 - B. 3.95 s
 - C. 4.00 s
 - D. 4.05 s
23. What does a large standard deviation indicate?
- A. The data is clustered closely to the mean.
 - B. The data is spread widely around the mean.
 - C. The data is normally distributed.
 - D. The data is not normally distributed.
24. Which is a performance-related fitness component?
- A. Body composition
 - B. Agility
 - C. Flexibility
 - D. Muscular endurance

Turn over

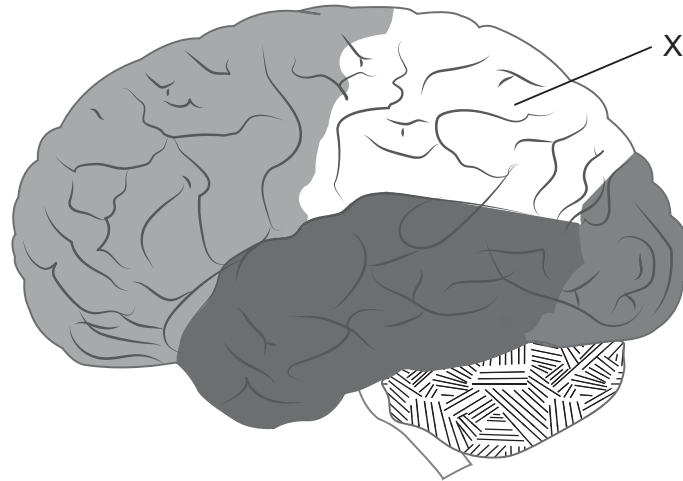
25. What does the training principle of reversibility refer to?
- A. The gradual increase of intensity in training demands
 - B. The variability of training loads and skills
 - C. The replication of performance demands in training
 - D. The training benefits are lost if training ceases

26. The diagram below shows the generalized structure of the skin. What is labelled X?



- A. Dermis
- B. Hair follicles
- C. Glands
- D. Fat

27. The diagram shows the left lateral view of the brain. Which lobe is labelled X?



- A. Frontal lobe
 - B. Parietal lobe
 - C. Occipital lobe
 - D. Temporal lobe
28. Which endocrine organs are found in the head?
- A. Pineal, pancreas
 - B. Thyroid, adrenal
 - C. Pineal, hypothalamus
 - D. Hypothalamus, thyroid
29. How are circulating hormone levels regulated?
- I. Feedback loops
 - II. Signals from the nervous system
 - III. Chemical changes in the blood and other hormones
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

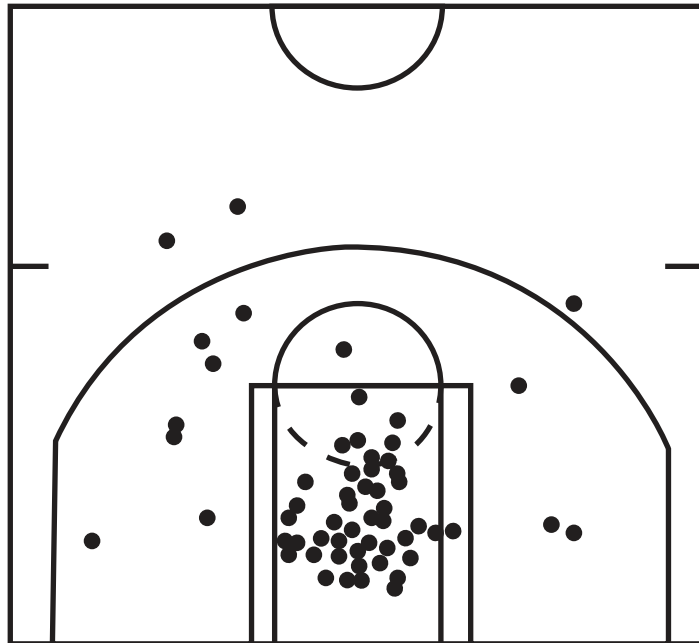
Turn over

- 30.** What is the definition of fatigue in sports?
- A. A reversible, exercise-induced decline in performance
 - B. A depletion of muscle creatine phosphate stores
 - C. A reduction in reaction time to a stimulus
 - D. A decrease in the production of lactate
- 31.** What is a cause of peripheral fatigue for an athlete completing a 100 m sprint?
- A. Depletion of muscle and liver glycogen
 - B. Depletion of creatine phosphate and ATP
 - C. Reduction of Ca^{2+} release
 - D. Dehydration
- 32.** What is drag?
- A. A dimensionless scalar quantity, which is the ratio of friction and normal reaction force
 - B. A force applied to attempt to move a stationary object
 - C. A force that acts parallel to the interface of two surfaces that are in contact
 - D. A force acting to oppose the motion of an object through a fluid
- 33.** What is an example of an athlete reducing form drag?
- A. A cyclist adopting a low profile position
 - B. A swimmer staying underwater for as long as possible at the start of the race
 - C. A swimmer using a shark-skin suit
 - D. A soccer player using soccer boots on a grass surface
- 34.** Which is a feature of non-linear pedagogy in sport?
- A. Content-focused learning
 - B. Coach-led learning
 - C. Development of creative processes in athletes
 - D. Transmission of fixed knowledge from a coach

35. What are the reasons for using notational analysis?
- I. Provide consistent and reliable feedback
 - II. Provide tactical and technical evaluations
 - III. Provide an objective method of recording performance

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

36. The diagram shows where shots were taken from during a basketball game. What type of simple notation system was used?



- A. Scattergram
- B. Frequency table
- C. Sequential system
- D. Flow chart

Turn over

- 37.** Which statement is correct?
- A. Children inherit all of their genes from their mother.
 - B. All human characteristics are expressed developmentally.
 - C. Some characteristics require an environmental switch.
 - D. Genotypes are determined by phenotypes.
- 38.** Which is an environmental factor that influences performance?
- A. Training
 - B. Muscle fibre type
 - C. Height
 - D. Lung capacity
- 39.** What is a function of the immune system?
- A. To sustain increased levels of cortisol
 - B. To lower leucocyte numbers
 - C. To increase levels of adrenaline
 - D. To protect the body against pathogens
- 40.** Which strategy can athletes use to reduce their risk of infection?
- A. Maintain close contact with people
 - B. Maintain oral hygiene
 - C. Maintain high-intensity training
 - D. Maintain high-frequency of training
-

References:

15. [Physics pole vault] HAY JAMES G., THE BIOMECHANICS OF SPORTS TECHNIQUES, 4th Ed., ©1993 Reprinted by permission of Pearson Education, Inc.
26. [Layers of skin] De Agostini Picture Library/Getty Images.

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