Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Higher level
Paper 1

Wednesday 3 November 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]**.

8821 – 6601

14 pages

1. What is the primary function of the skull and vertebral column?

A. Attachment

B. Movement

C. Support

D. Protection

2. Which describes hypertrophy?

A. A decrease in the size of a muscle fibre usually caused by a decrease in muscle use.

B. The ability of a muscle to shorten in length caused by an increase in muscle use.

C. The ability of a muscle to return to its original length due to relaxation of fibres.

D. An increase in size of the whole muscle due to an increase in size of the myofibrils.

3. What is total lung capacity?

A. The volume of air in the lungs after a maximum inhalation

B. The maximum volume of air that can be exhaled after a maximum inhalation

C. The volume of air in excess of tidal volume that can be exhaled forcibly

D. The volume of air still contained in the lungs after a maximal exhalation

4. Under normal conditions, what is the percentage saturation of hemoglobin in red blood cells as they leave the lungs?

A. 68.5 %

B. 78.5 %

C. 88.5 %

D. 98.5 %

5. An athlete has a low blood platelet count. Which process will be difficult for the athlete's body?

A. Clotting

B. Transporting oxygen

C. Fighting disease

D. Balancing osmolarity

6. Which circulation is responsible for the exchange of oxygen between the blood and the lungs?

A. Systemic circulation

B. Coronary circulation

C. Pulmonary circulation

D. Vascular circulation

7. What changes occur to a boxer's stroke volume and heart rate while punching during a bout?

	Stroke volume	**Heart rate**
A.	Increase	Increase
B.	No change	Increase
C.	Increase	Decrease
D.	Decrease	Increase

8. Which is considered a micronutrient?

A. Lipid

B. Vitamin

C. Water

D. Protein

9. Which element is unique to the molecular formula of protein?

A. Carbon

B. Nitrogen

C. Hydrogen

D. Oxygen

10. Which reaction represents aerobic catabolism?

A. Gluconeogenesis

B. Lactate formation

C. Electron transport chain

D. Protein synthesis

11. During fasting, the body releases hormones that promote the breakdown of glycogen to replenish glucose in the body. What is this process called?

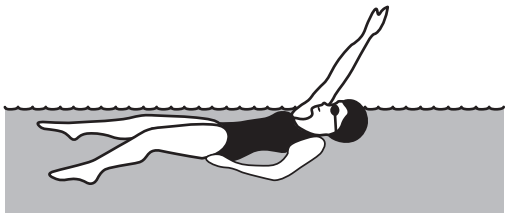
A. Gluconeogenesis

B. Glycogenolysis

C. Lipolysis

D. Glycolysis

12. The diagram shows a swimmer performing backstroke. What type of movement correctly describes the motion at the shoulder joint?



A. Circumduction

B. Eversion

C. Adduction

D. Supination

13. Which term is correctly matched to the type of quality that it measures?

	Term	Quality
A.	Acceleration	Scalar
B.	Displacement	Vector
C.	Distance	Vector
D.	Speed	Vector

14. When the forearm acts as a first-class lever to extend the elbow, which muscle acts as the effort to lift a load?

A. Biceps brachii

B. Deltoid

C. Trapezius

D. Triceps brachii

15. A golfer wants to increase the force applied to their golf ball to make it travel further. Assuming the ball will be hit with the same acceleration each time, which golf club should they use?

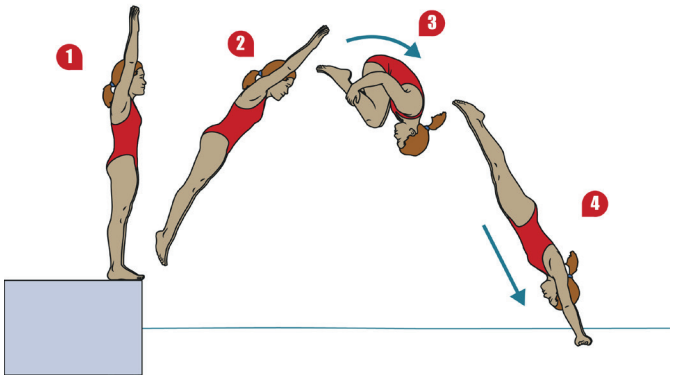
A. The longest golf club

B. The heaviest golf club

C. The lightest golf club

D. The widest golf club head

16. The diagram shows someone performing a tuck dive. How does the angular velocity change when the diver moves from position 2 to position 3 in the diagram?



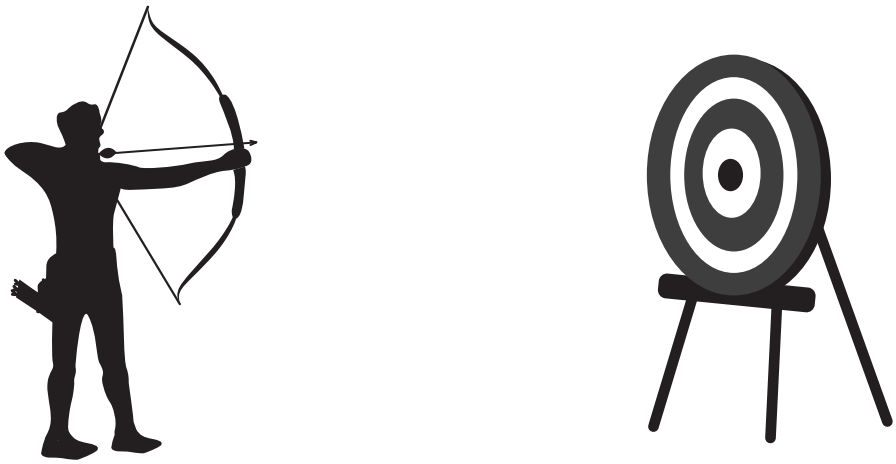
A. It decreases to change the moment of inertia.

B. It remains the same in order to conserve momentum.

C. It increases in order to conserve momentum.

D. It is not altered with a change in moment of inertia.

17. On a windy day, an archer has two minutes to shoot six arrows at an outdoor target. What type of skill is primarily required by the archer?



A. Cognitive

B. Perceptual

C. Perceptual–motor

D. Motor

18. The diagram shows a field hockey player. What is the correct classification of motor skills for dribbling in hockey?

A.	Gross	Serial	Open
B.	Fine	Serial	Closed
C.	Gross	Discrete	Open
D.	Fine	Discrete	Closed

19. Which component of sensory input feeds back information about blood pressure?

A. Proprioceptors

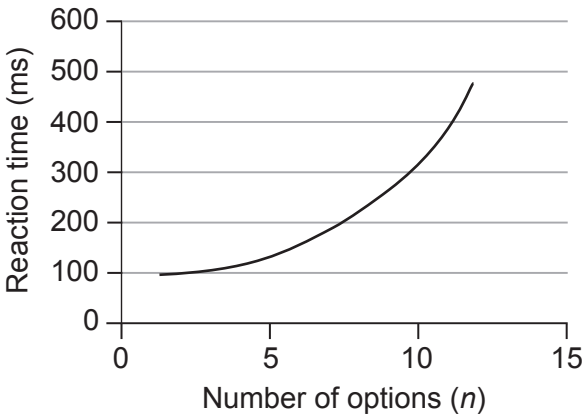
B. Interoceptors

C. Exteroceptors

D. Perception

20. The graphs represent how reaction time changes when additional possible outcomes are introduced into a situation. Which graph represents Hick's Law?

A



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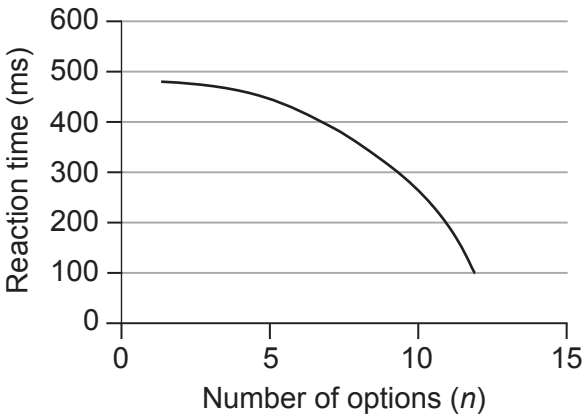

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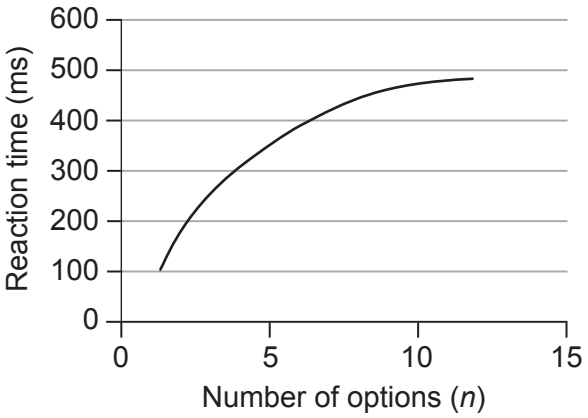

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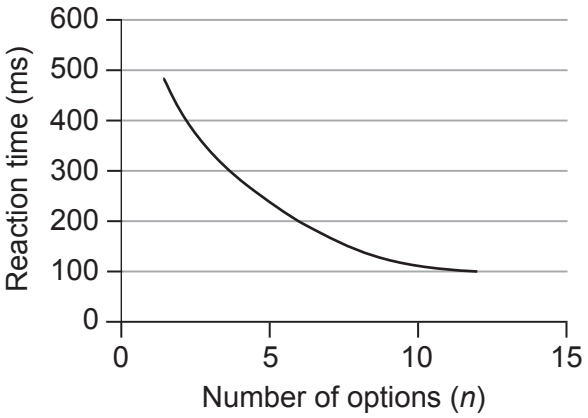


21. Which skill demonstrates that the autonomous stage of learning has been reached?

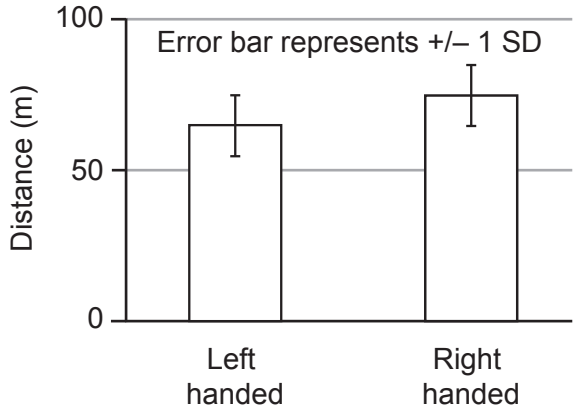
A. A basketball player dribbles the ball down the court with uncoordinated movements.

B. A golfer hits balls on a driving range to improve the consistency of their shots.

C. A swimmer can perform a turn at the end of each lap with consistency.

D. A gymnast watches the performance of a skill and attempts to replicate it.

22. A group of baseball players hit both left handed and right handed. The mean distance travelled by the ball is shown in the chart. What might be concluded about the statistical significance of the data?



A. LH group hits significantly further than the RH group.

B. RH group hits significantly further than the LH group.

C. LH group hits significantly shorter than the RH group.

D. RH group does not hit significantly further than the LH group.

23. A statistical analysis found that the average professional racing cyclist could sustain an average power output of 6.0 watts per kilogram (W kg^{-1}) with a standard deviation of 0.5 W kg^{-1}. What percentage of the total spread of the data will be represented by a range in power from 5.0–7.0 W kg^{-1}?

A. 68 %

B. 90 %

C. 95 %

D. 99 %

24. What is the benefit of using the coefficient of variation over standard deviation?

A. The coefficient of variation allows a researcher to compare the variance of two datasets and is expressed as a percentage.

B. The coefficient of variation allows a researcher to compare the difference in the standard deviations of two unrelated means and is expressed as a percentage.

C. The coefficient of variation is a value that will measure the central tendency of data.

D. The coefficient of variation is derived from a *t*-test and provides a *p*-value.

25. A track athlete runs 800 m at 5-minute intervals over 30 minutes. Which element of their general training programme is this?

A. Endurance training

B. Progression

C. Resistance training

D. Reversibility

26. What is the first artery that branches off the aorta on its way to the brain?

A. Right common carotid

B. Brachiocephalic

C. Left common carotid

D. Internal carotid

27. Why does the brain need a continuous supply of glucose?

A. Glucose stores in the brain are located behind the blood–brain barrier and are inaccessible to the brain cells.

B. Glucose is exchanged very slowly between the blood and the brain cells, so a continuous supply is needed.

C. The quantities of glycogen stored in the brain are not sufficient for the brain's energy requirements.

D. High glucose levels in the brain impair its function.

28. Which endocrine gland is located on the superior aspect of the kidney?

A. Pancreas

B. Hypothalamus

C. Pituitary

D. Adrenal

29. What factor determines if circulating hormones will elicit a response in target organs?

A. The ability of the hormone to work without entering the blood.

B. The ability of the hormone to attach to an intracellular receptor.

C. The hormone must be secreted from a specific endocrine gland in a sustained manner.

D. The location of a specific receptor that will bind to a particular hormone.

30. Which describes central fatigue?

A. Fatigue that originates from physiological changes in the brain or spinal cord

B. Fatigue that results from a decrease in the total number of cross bridges that can form between the actin and myosin

C. Fatigue that results from decreased glycogen stores in the muscle

D. Fatigue that results from a build-up of phosphate in the muscle

31. High-intensity interval training (HIIT) is widely practised. Which is likely to be included in a HIIT programme?

A. A 10-minute aerobic cross-training routine

B. 20 minutes of a five-a-side soccer game

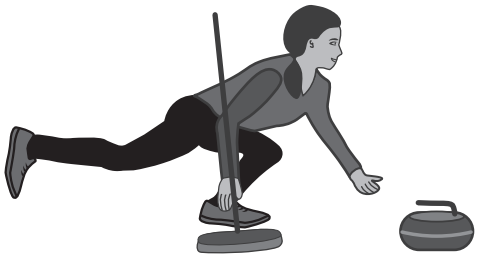
C. 30 seconds on a static bike, with 90 seconds of rest

D. A 15-minute yoga routine

32. Four climbers compare the grip quality of their boots. Which climber's boots have the greatest friction force?

	Coefficient of friction (μ)	Normal reaction force (R)
A.	1.0	650 N
B.	0.8	1000 N
C.	1.5	600 N
D.	1.1	500 N

33. In the sport of curling, team members slide a large stone across ice towards a target. Which is relevant to the stone as it moves across the ice?



A. The coefficient of static friction

B. The coefficient of dynamic friction

C. The coefficient of static drag

D. The coefficient of dynamic drag

34. Which is an example of non-linear pedagogy?

A. A tennis coach allows a novice to play with a larger tennis ball.

B. A basketball coach teaches correct hand placement during a free throw.

C. A football coach instructs the team on defensive strategy.

D. A coach models the correct technique for a gymnast to copy.

35. Which are examples of task constraints?

A.	Decision making	Adapting equipment
B.	Adapting rules	Quality of playing surface
C.	Decision making	Tempo of game
D.	Adapting rules	Adapting equipment

36. What does notational analysis provide for a coach?

I. It is an objective way of recording a performance.

II. It quantifies performance in a consistent and reliable manner.

III. It permits a subjective analysis if technical proficiency is achieved.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

37. Which statement is correct regarding gene expression?

A. Traits like VO_2 max and height are inherited and cannot be altered by environmental influence.

B. Traits like VO_2 max and height are not inherited but rely on environmental influence to reach their full potential.

C. Phenotypic expression or human characteristics cannot be determined by genotype.

D. The number of possible outcomes for human characteristics is limited due to the contribution from only two parents.

38. How can genes influence human characteristics?

A. Genes code for carbohydrates, which are responsible for the development of an individual.

B. Only a single, or at most a few, genes are responsible for superior athletic performance.

C. The physical expressions of human characteristics are called genotypes.

D. Genes can be switched on or off depending on internal or external factors.

39. Which describes inflammation?

A. Tissue damage increases fluid build-up, allowing immune cells to reach the site of damage.

B. The ability to stop an area of the body from continuing to bleed.

C. The skin has secretions that help to prevent disease from invading the body.

D. A localized decrease in the number of leucocytes at the site of tissue damage.

40. Which may indicate that an athlete has overtrained?

A. The athlete shows increased leucocyte count.

B. The athlete shows decreased leucocyte count.

C. The athlete will have decreased innate chemical factors.

D. The athlete shows no signs of increased inflammation.

References:

16. Courtesy Swim England.