Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Higher level
Paper 1

Thursday 19 May 2022 (morning)

1 hour

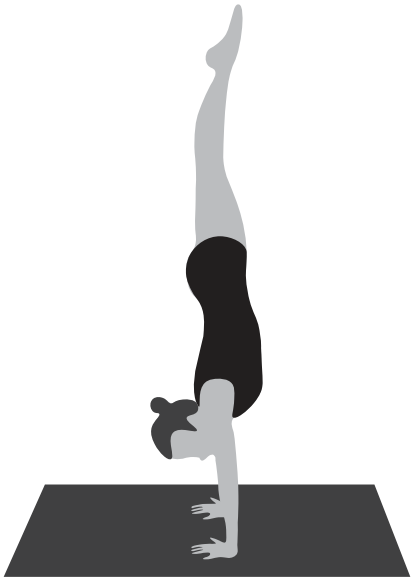
Instructions to candidates

- 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]**.

2222 – 6601

15 pages

1. The diagram shows a gymnast performing a handstand. What is the position of the tarsals in relation to the femur?



A. Superior

B. Inferior

C. Lateral

D. Medial

2. What is the function of a ligament?

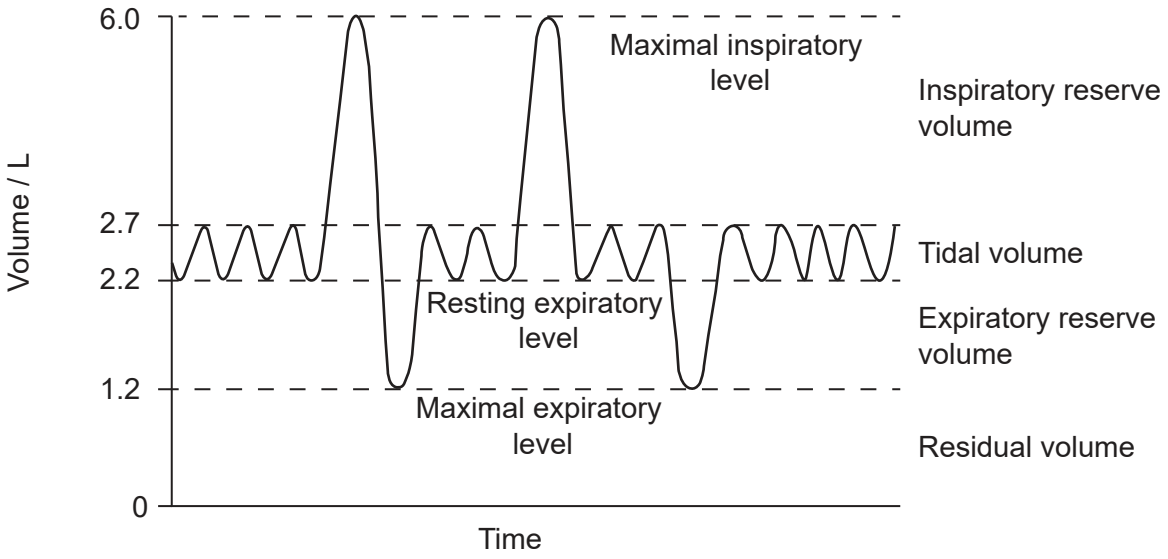
A. To attach muscle to bone

B. To attach bone to bone

C. To reduce friction

D. To secrete synovial fluid

3. The diagram shows average respiratory volumes. What happens to the expiratory reserve volume (ERV) when an athlete begins to run?



A. It increases until the residual volume is 0 litres.

B. It decreases.

C. There is no change.

D. It increases but is limited by residual volume.

4. Which occurs during the inhalation phase of ventilation during exercise?

A.	increased pressure in the lungs	contraction of the internal intercostal muscles
B.	relaxation of the diaphragm	decreased volume in the lungs
C.	increased volume in the lungs	decreased pressure in the lungs
D.	contraction of the diaphragm	decreased airflow

5. What is the function of leucocytes?

A. To assist in clotting the blood.

B. To transport oxygen.

C. To protect the body from infection.

D. To transport carbon dioxide.

6. Which describes the cardiac output of an athlete recovering from strenuous exercise?

	Stroke volume (ml per beat)	**Heart rate (bpm)**
A.	decreasing	unchanged
B.	increasing	decreasing
C.	unchanged	decreasing
D.	decreasing	decreasing

7. The maximal oxygen uptake of an athlete when tested on a treadmill is measured to be 53 ml kg^{-1} min^{-1}. What happens to this measurement when using an arm ergometer?

A. It increases to 120 % – 130 %.

B. It decreases to 70 % – 80 %.

C. It remains unchanged.

D. It decreases to 20 % – 30 %.

8. Which process occurs when blood glucose levels are decreased?

A. Glycolysis

B. Lipolysis

C. Glycogenolysis

D. Glycogenesis

9. Which represents the production of adenosine triphosphate (ATP) via the aerobic glycolysis system?

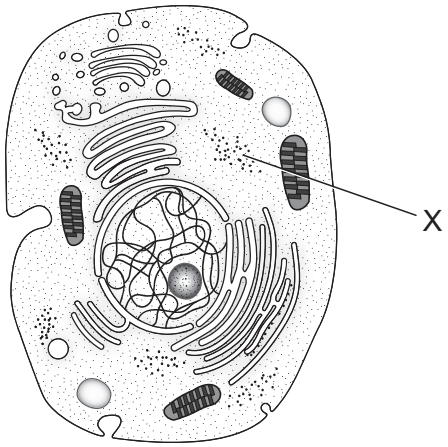
A. PC + ADP → 1ATP + C

B. glucose → pyruvate → 2 ATP + lactate + H^+

C. glucose → pyruvate + O_2 → acetylCoA → Krebs cycle → electron transport chain → 38 ATP + H_2O + CO_2 + heat

D. ADP + P = ATP

10. The diagram shows an animal cell. What is the function of X?



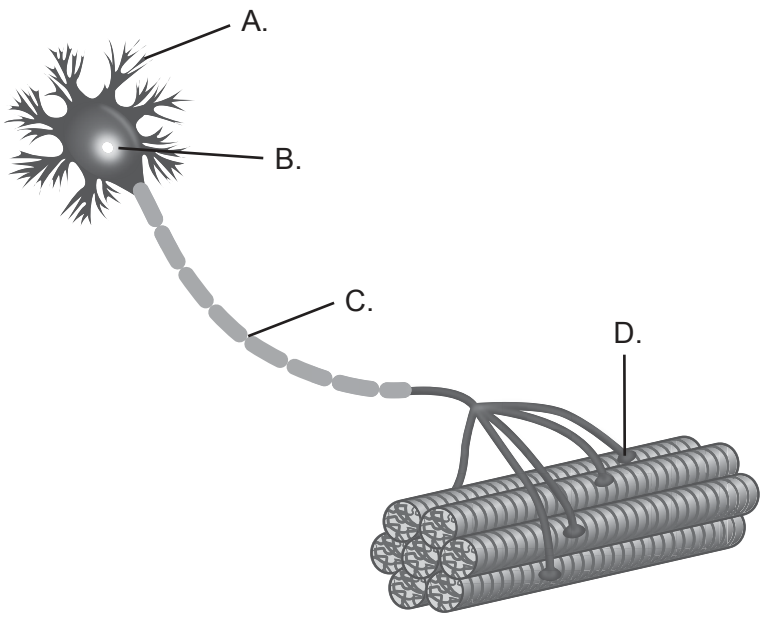
A. Protein synthesis

B. Controlling gene expression

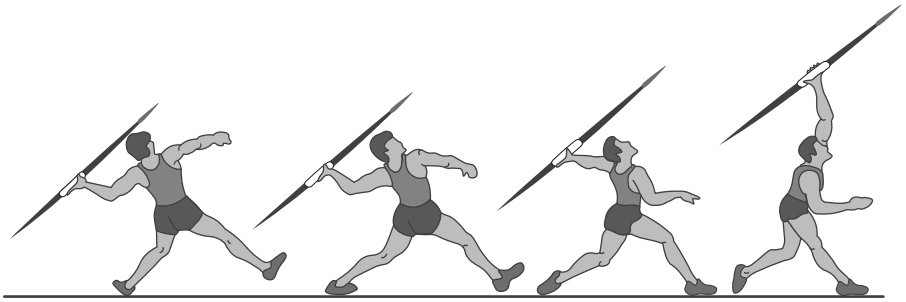
C. Cell respiration

D. Ingestion and removal of waste

11. The diagram shows a motor unit. In which area does the neurotransmitter acetylcholine act?



12. The diagram shows an athlete extending their left elbow while throwing a javelin. According to the sliding filament theory, which occurs in the muscle fibres of the athlete's left triceps?



A. The H zone increases.

B. The A band shortens.

C. The Z lines move closer together.

D. The A band lengthens.

13. The diagram shows a downhill speed skier. What type of muscle contraction occurs in the skier's quadriceps during this action?

A. Isotonic eccentric

B. Isotonic concentric

C. Isokinetic

D. Isometric

14. Which muscle is the agonist during the lowering phase of a sit-up?

A. Pectoralis

B. Rectus abdominis

C. Erector spinae

D. Latissimus dorsi

15. The diagram shows a volleyball player serving right-handed. Which is an example of a first-class lever during the acceleration phase of the serve?

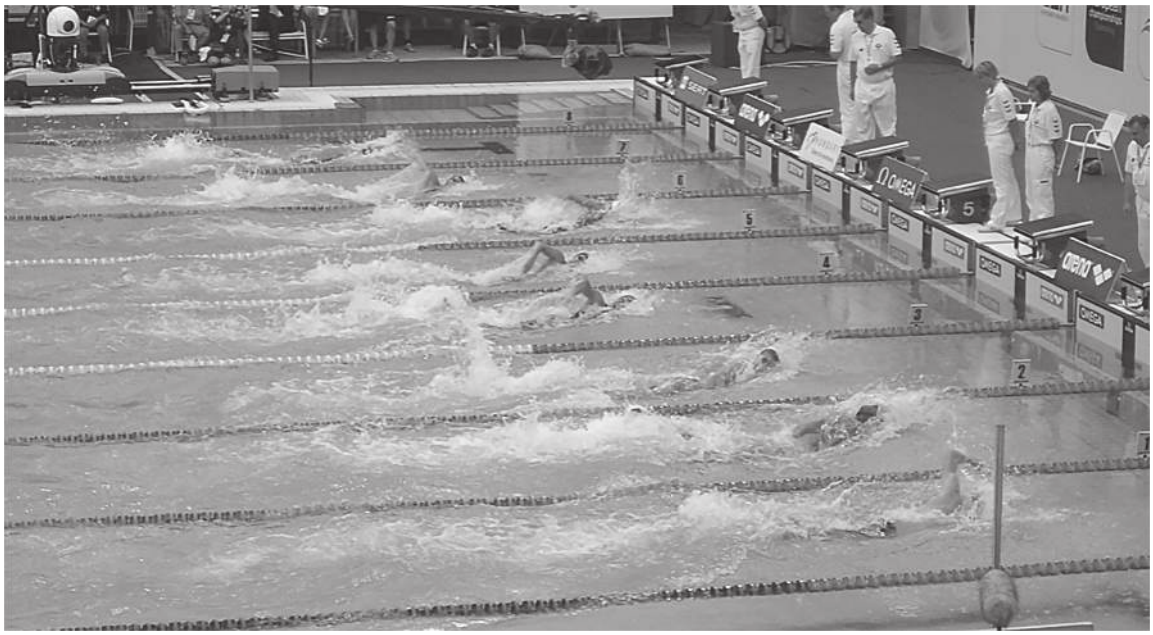
A. Extension of the right elbow

B. Flexion of the left elbow

C. Plantar flexion of the right ankle

D. Extension of the left knee

16. The image shows a 100 m freestyle swimming race. What is the classification of motor skills for a competitor in this race?



A. Interactive

B. Discrete

C. Fine

D. Coactive

17. Which is an example of a perceptual motor ability?

A. Reacting to the starter pistol.

B. Lifting a heavy weight.

C. Completing a vertical jump.

D. Analysing a video of a 1500 m run.

18. Which is an example of reaction time at the start of a 100 m swimming race?

A. The time it takes to sense the sound of the starter pistol.

B. The time from the sounding of the starter pistol to the initiation of movement.

C. The time taken to hear the starter pistol and complete the movement off the block.

D. The time taken to hear the starter pistol and enter the water.

19. When learning a new skill, how do coaches generally make the activity predictable and more self-paced?

I. Decrease the number of stimuli

II. Decrease the intensity of stimuli

III. Allow increased movement time

A. I and II only

B. I and III only

C. II and III only

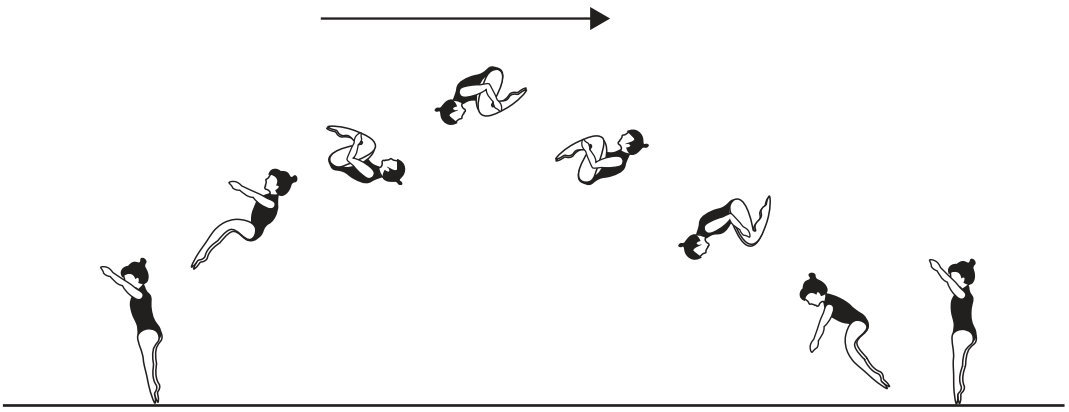
D. I, II and III

20. Which best describes the characteristics of a novice learner in the cognitive phase of learning a physical skill?

A.	Relies on external feedback	Clear knowledge of skill requirements
B.	Relies on internal feedback	Clear knowledge of skill requirements
C.	Relies on external feedback	Does not have clear knowledge of skill requirements
D.	Relies on internal feedback	Does not have clear knowledge of skill requirements

21. The diagram shows a gymnast performing a tuck somersault.

What type of transfer occurs when a gymnast learns that forming a tuck in a somersault will reduce the moment of inertia and allow them to spin faster?



A. Skill to skill

B. Practice to performance

C. Stage to stage

D. Principles to skills

22. A researcher is designing a study to assess free-throw ability in basketball. How could they improve the reliability of the data?

I. Increase the number of participants

II. Allow participants to record their own scores

III. Increase the number of trials per participant

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

23. A study investigated the effects of a carbohydrate-rich mouthwash on soccer players. The investigators used a double-blind protocol. What characterizes a double-blind study?

A. The investigators and participants know who is given the carbohydrate-rich mouthwash.

B. The investigators know which participants are given the carbohydrate-rich mouthwash but the participants do not.

C. Neither the investigators nor the participants know which participants are given the carbohydrate-rich mouthwash.

D. The investigators know which participants are given a placebo but the participants do not.

24. What is the predominant fitness component required for high-level performance in shot put?

A. Aerobic capacity

B. Agility

C. Muscular endurance

D. Power

25. Which fitness test is used to evaluate the effectiveness of a cardiovascular endurance training programme?

A. Cooper’s 12-minute run

B. Illinois agility test

C. Sit and reach

D. Maximum push-ups

26. Which are the functions of the skin?

I. Regulation of body temperature
II. Protection and immunity
III. Synthesis of vitamin D

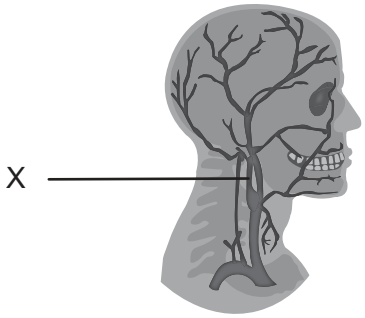
A. I and II only

B. I and III only

C. II and III only

D. I, II and III

27. The diagram shows the blood supply to the brain. What is X?



A. The right brachiocephalic trunk

B. The left brachiocephalic trunk

C. The right internal carotid artery

D. The right external carotid artery

28. When competing in hot weather, which gland regulates water in the body?

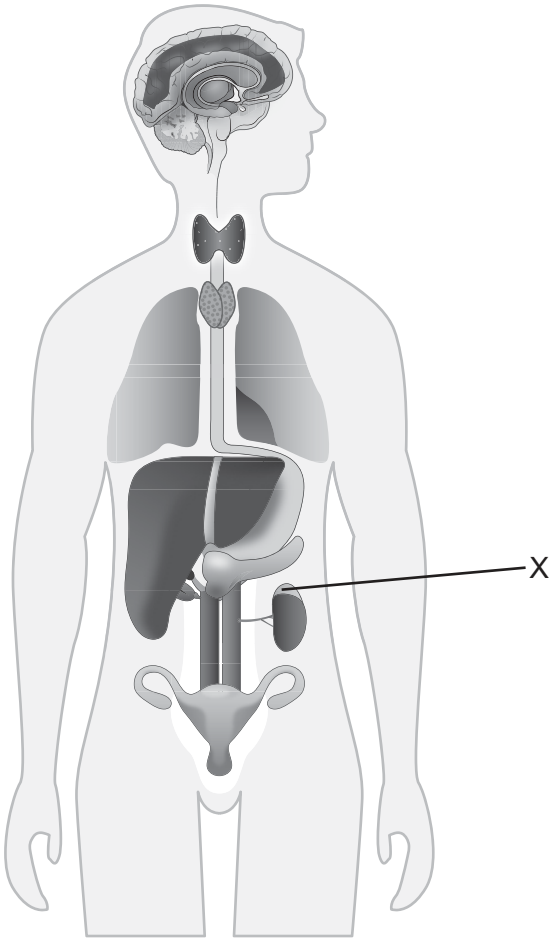
A. The pineal gland

B. The pituitary gland

C. The thyroid gland

D. The pancreas

29. The diagram shows the endocrine system. What is X?



A. The hypothalamus

B. The pineal gland

C. The pancreas

D. An adrenal gland

30. Which is a characteristic of peripheral fatigue?

A. It develops rapidly.

B. It is developed during prolonged exercise.

C. It is caused by impairment of the central nervous system.

D. It causes mental fatigue.

31. What strategies can a coach employ to minimize fatigue during a basketball game?

A. Ensure players are substituted regularly.

B. Ensure players consume low GI food at half time.

C. Ensure the best players complete the full game.

D. Ensure players have complete rest the week before the match.

32. Which would reduce the coefficient of friction?

A. An ice skater sharpens their skates.

B. A rock climber applies chalk to their hands when climbing.

C. A baseball player uses cleats (studs) on their boots.

D. A golfer wears a glove when hitting the ball.

33. The diagram shows a cyclist riding in the “top tube safe” position. Why does a cyclist use this position to increase speed?

A. To increase friction

B. To decrease ground reaction force

C. To decrease air resistance

D. To increase push

34. What is a feature of non-linear pedagogy?

A. Content-focused learning

B. Process-orientated learning

C. Coach-led learning

D. A coach has responsibility for all learning

35. What is a limitation of using information technology in sports analysis?

A. It may lead to an over-reliance on collected data.

B. Many new technologies are increasingly inexpensive.

C. It generates large quantities of objective data.

D. Many technologies are available as mobile/cellphone apps.

36. The frequency table shows the individual data for a soccer player during one game.

Technical data	**Individual data**
Involvement with ball	45
Short passes	28
Long passes	5
Crosses	2
Headers	3
Tackles	2
Shots on target	1

What are the strengths of using this data for analysis?

A. It is useful for concurrent feedback.

B. It provides objective data for feedback.

C. It provides sequential data.

D. It provides information about successful performances.

37. How can genes influence human characteristics?

I. Single genes always determine measurable human characteristics.
II. Genes affect the development of an individual.
III. Genes can be switched on by external factors.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

38. A sporting institute sets up a talent ID programme. Which data would be most relevant?

A. Ancestry

B. Income

C. Nationality

D. Diet

39. An athlete has sustained cortisol levels that suppress their immune system. What has caused this?

A. Regular rest days during their training programme

B. Maintaining a high carbohydrate diet during their training programme

C. Undertaking a short-term high-intensity training programme

D. Undertaking a high-intensity and prolonged training programme

40. During the Olympic Games, athletes live in a residential village. What strategy will limit the risk of illness and infection spreading among the athletes?

A. All athletes eating in the same food service areas

B. All sleeping quarters are shared

C. All athletes using a common water source

D. All athletes being required to wash their hands regularly

References:

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