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Sports, exercise and health science

Higher level

Paper 1

25 October 2023

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

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 movement involves bones of the axial skeleton?
 - A. Extension of the elbow when pitching a baseball
 - B. Rotation of the neck to breathe while swimming freestyle
 - C. Flexion of the knee when rowing
 - D. Pronation of the radius and ulna joint to apply topspin in tennis

2. Which correctly matches the connective tissue to its function?
 - A. Ligaments are the connections between muscles and bones.
 - B. Cartilage reduces friction between bones and helps absorb shock.
 - C. Tendons are the connections between bones and bones.
 - D. The synovial membrane provides stability to the joint.

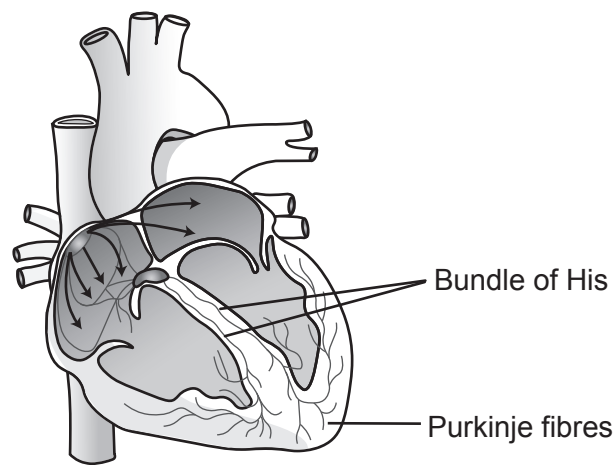
3. Which is the origin of a muscle?
 - A. The attachment of a muscle to a stationary bone
 - B. The attachment of a muscle to a joint
 - C. The attachment of a muscle to a moveable bone
 - D. The attachment of a muscle to a bursa

4. An athlete is exercising outside in a temperature of 20°C. What is the role of the nose in the respiratory airway?
 - A. To cool air in the respiratory airway
 - B. To filter dust particles in the inhaled air
 - C. To dry the air in the respiratory airway
 - D. To reduce mucus secretions to the trachea

5. Which are components of plasma?

A.	Erythrocytes	Platelets	Leucocytes
B.	Proteins	Platelets	Electrolytes
C.	Leucocytes	Erythrocytes	Nutrients
D.	Proteins	Electrolytes	Nutrients

6. The diagram shows the conduction pathways of the heart.



An electrical signal leaves the sinoatrial node. What does this initiate first?

- A. Atrial contraction
- B. Ventricular contraction
- C. Atrial relaxation
- D. Ventricular relaxation

7. Which results in the highest cardiac output?

	Heart rate	Stroke volume
A.	elevated	decreased
B.	maintained	elevated
C.	decreased	elevated
D.	elevated	elevated

8. Which defines the term diastolic blood pressure?

- A. The force exerted on arterial walls during atrial contraction
- B. The force exerted on venous walls during atrial contraction
- C. The force exerted on arterial walls during ventricular contraction
- D. The force exerted on venous walls during ventricular contraction

9. An athlete has a high maximal oxygen consumption level ($VO_2\text{max}$). What information does this provide?

- A. The athlete has poor aerobic capacity.
- B. The athlete has good aerobic capacity.
- C. The athlete's oxygen carrying capacity is reduced.
- D. The athlete has a greater reliance on anaerobic respiration.

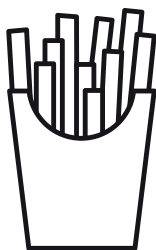
10. What is the ratio of C, H and O in the chemical composition of a glucose molecule?

- A. 2:1:2
- B. 1:3:1
- C. 1:2:1
- D. 1:2:3

11. Which contains the most saturated fat?

- A. A spoon of vegetable oil
- B. A portion of red meat
- C. A piece of fruit
- D. A cup of grains

12. Which plate represents a balanced diet?



A. French fries



B. Mixed fruit salad



C. Mixed salad with eggs and nuts



D. Cakes

13. Which is a catabolic reaction?

- A. Conversion of glycogen into glucose
- B. Conversion of free fatty acids and glycerol into triglycerides
- C. Conversion of glucose into glycogen
- D. Conversion of amino acids into proteins

14. Which processes metabolize glucose and fat?

- I. Krebs cycle
 - II. Glycolysis
 - III. Oxidative phosphorylation
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

- 15.** An athlete, while running, sprains the ligaments on the lateral side of their ankle. What type of movement occurred at the ankle to stretch the lateral tendons?
- A. Inversion
 - B. Dorsi flexion
 - C. Plantar flexion
 - D. Eversion
- 16.** Which term describes how velocity changes over time?
- A. Impulse
 - B. Displacement
 - C. Momentum
 - D. Acceleration
- 17.** Which are examples of a third class lever?
- I. Elbow extension when swinging a baseball bat
 - II. Plantar flexion of the ankle when jumping in basketball
 - III. Knee extension to kick a football
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

18. A basketball player while jumping, presses off the ground using their feet. Which represents the fulcrum?



- A. The gastrocnemius muscle
- B. The heel
- C. The tendon of the gastrocnemius
- D. The toes
19. A tennis ball is hit with backspin through the centre of mass. What effect does backspin have on the flight path of the ball?
- A. The flight distance is greater compared to a ball with no spin.
- B. The ball's flight path will swerve to the left.
- C. The flight distance will be shorter compared to a ball with no spin.
- D. The ball's flight path will swerve to the right.
20. A table tennis player observes the incoming shot before planning and executing their own shot. Which type of skill is involved in this process?
- A. Cognitive
- B. Perceptual
- C. Motor
- D. Perceptual motor

- 21.** Which demonstrates a skilled performer?
- A. A softball player who has a high batting average.
 - B. A basketball player who has a low shooting percentage.
 - C. A gymnast who falls on a beam routine.
 - D. A sprinter who false starts regularly.
- 22.** Which is an example of an interoceptor?
- A. The eyes detect light.
 - B. The muscle detects information about muscle length.
 - C. The hands detect information about touch.
 - D. The aorta detects information about arterial stretch.
- 23.** Which will increase response time?
- A. Rehearsing reactions to a stimulus
 - B. Lengthening stimulus transmission time
 - C. Introducing a second stimulus before the first is complete
 - D. Shortening the time from the beginning of a movement to its end
- 24.** A basketball player sees their shot go through the basket successfully. Which types of feedback do they receive?
- A. Knowledge of result, negative, concurrent
 - B. Knowledge of performance, positive, concurrent
 - C. Knowledge of performance, negative, terminal
 - D. Knowledge of result, positive, terminal

25. A 200 m swimmer records the time taken to swim each length.

50 m length	Split time (s)
1	29.5
2	30.7
3	31.5
4	30.3

What is the mean time taken to swim 50 m?

- A. 30.3
 - B. 30.5
 - C. 30.7
 - D. 31.0
26. A study monitored 100 m performance time. Initially, time was recorded using a stopwatch. During the study, the method was modified to use timing gates. Which aspect of study design was enhanced?
- A. Validity
 - B. Safety
 - C. Accuracy
 - D. Specificity
27. Ultramarathons are footraces of any distance longer than marathon distance (42.195 kilometres). Which component of fitness is of most significance to ultramarathon runners?
- A. Cardio-respiratory fitness (aerobic capacity)
 - B. Strength
 - C. Speed
 - D. Power

- 28.** Which fitness test is used to measure reaction time?
- A. Illinois agility test
 - B. 40-metre sprint
 - C. Hand grip dynamometer
 - D. Drop test
- 29.** Which is an inner layer of skin containing structures such as blood vessels?
- A. Epidermis
 - B. Dermis
 - C. Fat
 - D. Gland
- 30.** Which lobe of the brain is responsible for auditory processing?
- A. Occipital lobe
 - B. Frontal lobe
 - C. Temporal lobe
 - D. Parietal lobe
- 31.** Which are characteristics of hormones?
- I. Hormones are only released where they act in the body.
 - II. Hormones affect only specific receptors.
 - III. Hormones can be released in short bursts or over longer periods.
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

- 32.** Which regulates insulin release from the pancreas?
- A. Signals from the nervous system
 - B. Chemical changes in the blood
 - C. An increase in antidiuretic hormone (ADH)
 - D. Stimulation from the anterior pituitary gland
- 33.** Which activity would be classified as a high-intensity exercise?
- A. Running a 10 km road race
 - B. Rowing 2 km on a machine
 - C. Cycling 200 m in a velodrome
 - D. Swimming 1500 m in open water
- 34.** During recovery, which are restored to homeostatic levels?
- I. Oxygen saturation of myoglobin
 - II. Muscle creatine phosphate stores
 - III. Liver protein stores
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
- 35.** What does μ stand for in the equation $F = \mu R$?
- A. Friction
 - B. Drag force
 - C. Normal reaction force
 - D. The coefficient of friction

36. Which interaction between footwear and surface creates the most friction?

	Footwear	Surface
A.	spiked shoes	dry athletic track
B.	trainers (sneakers)	dusty basketball court
C.	soccer boots	wet grass pitch
D.	ice skates	ice skating track

37. A coach asks a colleague to use a notation system to categorize the location of players on the pitch throughout a game. Which notation system should the colleague use?

- A. Flow chart
- B. Scattergrams
- C. Frequency tables
- D. Sequential systems

38. Which would be considered a genotype?

- A. Expression of hair colour
- B. Rate of leg length growth
- C. The code for eye colour
- D. Proportion of muscle fibre type

- 39.** Which statement demonstrates the influence of genes on athletic characteristics?
- A. All genes code for proteins at birth and then influence characteristics over time.
 - B. Only 50 % of genes can be inherited and therefore have limited influence on athletic performance.
 - C. Individual genes influence the characteristics associated with athletic performance.
 - D. Athletic characteristics are influenced by training and nutrition.
- 40.** Which statement explains the purpose of the physical mechanisms in the immune system?
- A. They provide a barrier to prevent pathogens from entering the body.
 - B. They provide leucocytes to fight disease.
 - C. They provide blood proteins to help clot blood.
 - D. They provide an acidic environment in the stomach.
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