St Stephen's School

SERVE GOD SERVE ONE ANOTHER

PHYSICAL EDUCATION STUDIES ATAR

YEAR 12 – UNIT 3&4

SEMESTER 2, 2020

Student number: In figures ☐☐☐☐☐☐

Student Number: In words _____

_____

Time allowed for this paper

Reading time before commencing work: Ten minutes
Working time: Two and a half hours

Materials required/recommended for this paper

To be provided by the supervisor:
This Question/Answer Booklet
Multiple Choice Answer Sheet

To be provided by the candidate:
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters
Special items: non-programmable calculators approved for use in this examination

IMPORTANT NOTE TO CANDIDATES
No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of exam
SECTION ONE: Multiple-choice	20	20	25	20	20
SECTION TWO: Short answer	8	8	75	70	50
SECTION THREE: Extended answer	4	2	50	30	30
					100

Instructions to candidates

1. The rules for the conduct of examinations are detailed in the *St Stephen's School Parent Handbook and in SEQTA under documents.* Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer booklet preferably using a blue/black pen. Do not use erasable or gel pens.

3. Answer the questions according to the following instructions.

   Section One: Answer all the questions on the separate Multiple-choice Answer Sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

   Sections Two and Three: Write answers in this Question/Answer Booklet with a blue or black pen ONLY.

4. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.

5. Supplementary pages for planning/continuing your answers to questions are provided at the end of the Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Section One: Multiple-choice **20% (20 Marks)**

This section has 20 questions. Answer all questions on the separate Multiple-choice answer sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 25 minutes.

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1. Fast twitch muscle fibres are more suited to explosive activities because they have a:

   (a) high oxidative capacity, high resistance to fatigue, high force capacity
   (b) high glycolytic capacity, high force capacity, high speed of contraction
   (c) high oxidative capacity, high force capacity, high speed of contraction
   (d) low glycolytic capacity, high force capacity, high speed of contraction

2. A technique involving systematic tensing and relaxing of major muscle groups is commonly known as:

   (a) progressive muscle relaxation
   (b) meditation
   (c) yoga
   (d) progressive tension control

3. A lever designed to reduce the amount of force required to move a heavy object would be a:

   (a) first class lever, where the force arm is longer than the resistance arm
   (b) second class lever, where the force arm is longer than the resistance arm
   (c) third class lever, where the force arm is longer than the resistance arm
   (d) both (a) and (b)

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4. The angular momentum of a diver performing a reverse two and a half somersault with two and a half twists will be:

   (a) highest during the twist phase
   (b) lowest during the twist phase
   (c) highest during the somersault phase
   (d) constant throughout the movement

5. Establishing group goals, roles and norms are important for developing:

   (a) team dynamics
   (b) team confidence
   (c) team cohesion
   (d) team hierarchy

6. Without additional nutritional intervention, low intensity, continuous exercise lasting 3-4 hours will require the majority of the ATP to be resynthesised by breaking down:

   (a) carbohydrates
   (b) creatine phosphate
   (c) fats
   (d) proteins

7. Mental imagery can lead to performance improvements by:

   (a) improving neural pathways between the brain and the muscles
   (b) ensuring over arousal never occurs
   (c) improving muscle memory
   (d) providing visual cues to the athlete

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8. A sprint coach is analysing her athlete's start technique. After establishing the key features of the skill, the next stage in the qualitative analysis process is:

   (a) identifying the strengths and weaknesses of the athlete's performance
   (b) establishing some process goals for the athlete to follow
   (c) determining the appropriate angle to observe the athlete
   (d) providing some feedback on the areas to improve

9. Connective tissue sheaths support each cell and reinforce the muscle as a whole. Which answer reflects the appropriate order of connective tissue organisation from most external, to most internal?

   (a) endomysium, perimysium
   (b) epimysium, perimysium
   (c) perimysium, epimysium
   (d) endomysium, epimysium

10. Which is correct when considering leadership styles?

   (a) the athlete's skill level can determine the style adopted
   (b) male athletes always respond to a dictatorial approach
   (c) a casual leadership style should be the dominant approach in junior sport
   (d) leadership styles should not change as this can be confusing for the athlete

11. Which of the following is an appropriate sporting example of the biomechanical principle of inertia?

   (a) Increase muscle mass through strength training in order to increase the body's ability to rapidly accelerate.
   (b) Train with a weighted vest on during a sprint session so that smaller forces are required to overcome the inertia of the body.
   (c) Increase the length of a baseball bat to make it easier to swing.
   (d) Use racing flats/spikes in competition as the smaller mass of the shoes makes the athlete's feet feel light and quick.

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Questions 12 and 13 refer to the information below:

Ski Jumping involves competitors taking advantage of lift forces in order to travel the greatest possible distance. The images below show how ski jumping has evolved over the years.

A-Ski Jumper in the early 1900's

B-Ski Jumper in 2005

12. Which statement is correct in regard to the impact of fluid mechanics on the ski jumpers?

    (a) A high-pressure zone underneath the skier is generated through higher fluid velocity.
    (b) The fluid flowing over the top of the skier is accelerated, creating an area of low pressure.
    (c) The fluid flowing over the top of the skier is accelerated, creating an area of high pressure.
    (d) The high-pressure zone above the skier increases flight time.

13. When comparing the technique of the two ski jumpers, which statement is correct?

    (a) Ski jumper B will travel a further distance as they have a more appropriate angle of attack and airfoil shape to optimise lift and minimise drag.
    (b) Ski jumper A has a decreased cross-sectional area by standing in an upright, narrow position.
    (c) Ski jumper B ensures they have no angle of attack as this would otherwise decrease lift.
    (d) Ski jumper A experiences the greatest amount of lift due to the narrow ski position, but the most drag due to the loose clothing.

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14. A tennis player could increase the linear velocity of the tennis ball by:

(a) increasing the length of their racket
(b) increasing the racket's velocity through improved segmental interaction of the body's segments
(c) reducing the racket's radius of rotation by sliding their hands closer to the proximal end of the racket
(d) both (a) and (b)

15. Humans are usually 25–30% stronger when lowering, than when lifting a weight, in the same exercise. This is because

(a) less crossbridges are attached during eccentric movements.
(b) the force a muscle can resist in an eccentric contraction is less than the force a muscle can create concentrically.
(c) muscle fibres use both active and passive elements to produce force while they are lengthening, but they can only use active elements to produce force while they are shortening.
(d) the sarcomere has optimal overlap during an eccentric contraction.

16. The examples below outline the focus a coach jotted down when preparing his volleyball training session to develop the hit/spike. Which training activity has the coach employed?

- Use a ball toss to ensure a more predictable trajectory
- Only incorporate one type of hit (cross court only) to reduce attentional demands
- Remove defensive blockers to eliminate external pressure

(a) static to dynamic
(b) chaining
(c) practise to competition
(d) simple to complex

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17. An increased body temperature will contribute to fatigue by:

    (a) reducing oxygen availability to the cardiac muscle
    (b) reducing blood pressure and increasing plasma levels
    (c) increasing blood flow to the skin's surface
    (d) increasing blood flow to the muscles and vital organs

18. A ball that is hit furthest from its centre of gravity will travel with the greatest amount of:

    (a) linear velocity
    (b) torque
    (c) spin
    (d) angular momentum

19. Negative transfer of learning most likely occurs when

    (a) a hockey player strikes a golf ball but is not used to the smaller size the ball.
    (b) a tennis player batting in softball has to use a longer and heavier bat than the tennis racket they are used to.
    (c) the skills have a similar action but there are critical differences in technique.
    (d) all of the above.

20. Which statement is true in relation to the coordination continuum?

    (a) A skill cannot exhibit characteristics of both simultaneous and sequential movements.
    (b) Sequential movements favour generating maximal strength.
    (c) More simultaneous movements are effective for skills requiring accuracy.
    (d) Sequential force summation is optimised when the number of segments used is reduced.

End of Section One

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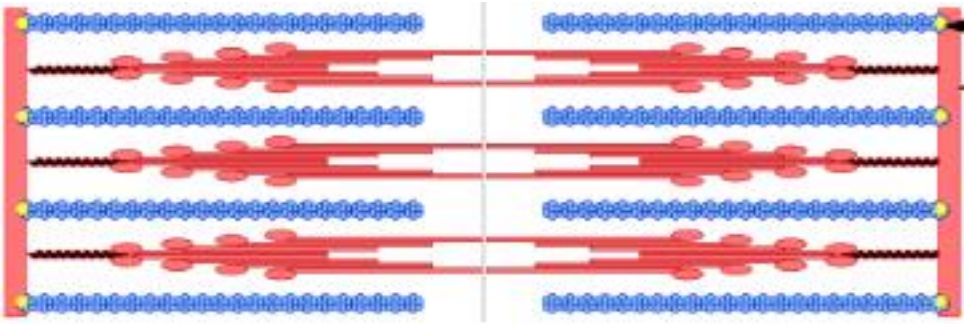
Section Two: Short answer **50% (70 marks)**

This section has eight questions. Answer all questions. Write your answers in the spaces provided. Use a blue or black pen. Do not use erasable or gel pens.
Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.
Suggested working time: 75 minutes.

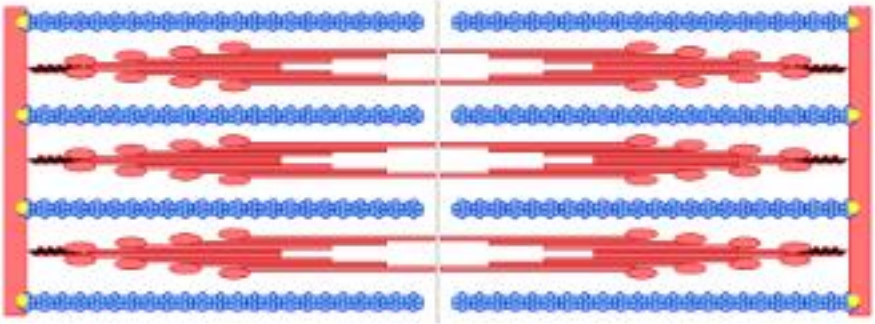
Question 21 **(10 marks)**

The diagram below represents what is happening at the microscopic level during the concentric contraction of the triceps muscle.

A



B



(a) Identify and explain the structure shown in the two diagrams.

(2 marks)

(b) Identify the contractile proteins involved in the change of length from diagram A to B.

(1 mark)

(c) Explain the theory which outlines the process that causes the change in length from diagram A to B.

(5 marks)

(d) Explain why the force that the muscle can produce is related to the velocity of contraction.

(2 marks)

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Question 22 **(6 marks)**

In September 2019, several athletes collapsed while competing in the marathon at the World Athletics Championships in Doha, Qatar. Despite running the marathon at midnight, the extreme temperatures – about 38℃ – meant 28 out of 68 women did not complete the race.

(a) Identify and explain two physiological responses to competing in the hot conditions in Doha.

(4 marks)

(b) Describe one method of heat transfer the athletes could have utilised during their event.

(2 marks)

Question 23 **(6 marks)**

The fixed Olympic bar press is a common exercise used by athletes trying to strengthen their shoulder muscles. The movement takes place as below:

(a) On the diagram below, label the fulcrum and resistance.

(2 marks)

(b) Classify the lever system above if the force is applied at the black "X".

(1 mark)

_____

(c) Using your knowledge of torque, explain the implications of applying the force at the white "X" instead of the black "X".

(3 marks)

_____

_____

_____

_____

_____

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Question 24 **(13 marks)**

Making the transition from a team of ‘me’ to a team of ‘we’ is a key component of group cohesion. This is particularly important in female sporting teams where studies have revealed the relationship between cohesion and performance is significantly stronger when compared with male teams.

(a) Outline the four (4) factors identified in Carron’s model of group cohesion. Give an example of each factor in a state representative netball team.

(8 marks)

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(b) Identify two methods to increase task cohesion within the netball team.

(2 marks)

(c) Explain three methods that a coach could utilise to measure group cohesion within their team.

(3 marks)

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Question 25 **(11 marks)**

In November 2019 a petition was begun to deny the city of Denver, Colorado (1603m above sea level) any professional sporting representation due to the altitude sickness experienced by visiting teams.

(a) Explain three chronic adaptations to altitude that a Denver athlete may gain in order to place him at an advantage in a professional NFL football game.

(3 marks)

(b) Once the petition was denied, visiting teams needed to quickly assess ways to acclimatise to the altitude conditions in Denver. Describe two methods that the teams could utilise to prepare for these conditions.

(4 marks)

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(c) As well as the issues with altitude, many visiting teams complained of the impact of the very low temperatures in Denver. Describe two physiological implications of competing in the cold conditions as an NFL footballer.

(4 marks)

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Question 26 **(7 marks)**

In the English Premier League soccer competition, new ball technology has ensured consistency across matches after many players were complaining that the ball was deflating slightly during the game, and this was causing their skill performance to decrease due to inconsistent bounce of the ball.

(a) Identify and define the biomechanical principle utilised in this example.

(2 marks)

(b) Explain the implications of a deflated ball in relation to the principle mentioned in part a).

(2 marks)

(c) One Premier League team in particular has been having additional issues with a number of players “slacking off” at training and not putting in 100% effort in games. Identify and define the psychological phenomenon occurring and provide one recommendation to reduce its likelihood in the team.

(3 marks)

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Question 27 **(10 marks)**

Each year the Ironman Triathlon World Championships are held at Kona, Hawaii. The event comprises a 3.9km open water swim, 180km cycle and 42.2km run. The average athlete takes over 12 hours to complete the course.

(a) Define the three types of drag experienced by a triathlete in the Ironman event. Explain one method the athlete could utilise to reduce each type of drag.

(6 marks)

(b) Due to the extreme length of the event, athletes must have a strict and well-planned nutrition program. Explain the nutrition plan for a triathlete pre- and during the Ironman event.

(4 marks)

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Question 28 **(7 marks)**

(a) The following table includes the key properties for the three types of muscle fibres. Complete the table by filling in the information for the unshaded boxes.

(4 marks)

Property	Muscle fibre types		
	Type I	Type IIa	Type IIb
Resistance to fatigue			
Contractile speed			
Major energy source			

(b) Being low in organisation yet high in complexity, the javelin event is a difficult skill to teach to young athletes. Identify and explain the coaching activity best utilised in teaching this skill. Justify your answer.

(3 marks)

End of Section Two

Section Three: Extended answer **30% (30 marks)**

This section contains **four** questions. You must answer **two** questions. Write your answers in the
spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 50 minutes.

Question 29 **(15 marks)**

Loris Karius is a German professional soccer player who formerly played as a goalkeeper for Premier League club Liverpool. Following the 2018 Champions League Final vs Real Madrid, Karius was blamed for the team's loss, having made two crucial mistakes during the fixture.

(a) Explain the role of the following parts of the nervous system, and how they would function together to allow Karius to attempt to save a shot on goal.

- Spinal cord
- Sensory neurons
- Motor neurons
- Brain
- Motor unit

(10 marks)

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In an attempt to address all concerns, Liverpool's goal keeping coach undertook a comprehensive review following the game into Karius' technique.

(b) Identify a qualitative model the coach might have employed to analyse Karius' technique and explain the structure of this model.

(5 marks)

See Next Page

Question 30 **(15 marks)**

Ellyse Perry is an Australian sportswoman who has represented her country in both cricket and soccer, debuting for both national teams at the age of 16. Perry is the youngest Australian to play international cricket and the first to have appeared at both the cricket and soccer World Cups.

(a) Explain the categories of transfer of learning as they relate to this example. Outline the effects of transfer and identify how two effects best relate to Perry's transition between cricket and soccer.

(8 marks)

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As the nominated free-kick specialist in her team, Perry is often required to “curl” the ball around the wall of players and past the goalkeeper.

(b) Explain the Magnus Effect as it relates to the application of side spin on the soccer ball. Use a diagram to support your answer.

(7 marks)

See Next Page

Question 31 **(15 marks)**

Between August 2014 and March 2015, the Australian Men's Cricket team had arguably one of their busiest summers. They played a four match test series against India in September, followed by one day matches and a T20 series against South Africa and England in December/January before the Cricket World Cup in February.

(a) Using your knowledge of periodisation, explain the application of the principles of peaking, tapering, and recovery in the annual plan for the team.

(9 marks)

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"The Test: A new era for Australia's team" is a docuseries following the Australian Men's Cricket Team, offering a behind the scenes look at how one of the world's best cricket teams fell from grace and was forced to reclaim their title and integrity. A key member of the series is head coach Justin Langer, given the role of rebuilding both the team and trust of the Australian public.

(b) Discuss the different styles of leadership Justin could have used throughout his time as Australian coach as well as a particular situation that would have best suited each leadership style.

(6 marks)

See Next Page

Question 32 **(15 marks)**

USA gymnast Simone Biles made headlines in 2020 by posting a video of her completion of a brand new vaulting stunt, prompting the naming of the “Biles Vault”.

(a) Using your knowledge of biomechanics, explain the application of the following principles in the vault event:

- Conservation of angular momentum
- Segmental interaction
- Force-Time

(9 marks)

(b) Explain three ergogenic aids that would benefit the performance of a gymnast. In your answer you must detail the specific advantage that the athlete may gain from the use of the aid.

(6 marks)

END OF EXAMINATION

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