

# Markscheme

May 2019

**Sports, exercise and health science**

**Standard level**

**Paper 3**

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**Subject details: Sports, exercise and health science SL paper 3 markscheme**

**Mark Allocation**

Candidates are required to answer **ALL** questions from two of the options [**2×20 marks**].  
Maximum total = [**40 marks**].

**Markscheme format example:**

Question			Answers	Notes	Total
5.	c	ii	this refers to the timing of the movements <b>OR</b> the extent to which the performer has control over the timing of the movement ✓ external paced skills are sailing/windsurfing/receiving a serve ✓ internal paced skills are javelin throw/gymnastics routine ✓		2 max

1. Each row in the “Question” column relates to the smallest subpart of the question.
2. The maximum mark for each question subpart is indicated in the “Total” column.
3. Each marking point in the “Answers” column is shown by means of a tick (✓) at the end of the marking point.
4. A question subpart may have more marking points than the total allows. This will be indicated by “**max**” written after the mark in the “Total” column. The related rubric, if necessary, will be outlined in the “Notes” column.
5. An alternative word is indicated in the “Answers” column by a slash (/). Either word can be accepted.
6. An alternative answer is indicated in the “Answers” column by “**OR**”. Either answer can be accepted.
7. An alternative markscheme is indicated in the “Answers” column under heading **ALTERNATIVE 1** etc. Either alternative can be accepted.

8. Words inside chevrons « » in the “Answers” column are not necessary to gain the mark.
9. Words that are underlined are essential for the mark.
10. The order of marking points does not have to be as in the “Answers” column, unless stated otherwise in the “Notes” column.
11. If the candidate’s answer has the same “meaning” or can be clearly interpreted as being of equivalent significance, detail and validity as that in the “Answers” column then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect) in the “Notes” column.
12. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
13. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script. “ECF acceptable” will be displayed in the “Notes” column.
14. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the “Notes” column.

**Option A — Optimizing physiological performance**

Question		Answers	Notes	Total
1.	a	Condition 2/sitting and wearing heated jacket ✓		1
1	b	-0.6 – -0.45 ✓ = -0.15 «°C» <b>OR</b> = 0.15 «°C» ✓	<i>Accept in the converse</i> <i>Accept ±0.02 for the second mark</i>	2
1	c	Condition 4/combination of heated jacket and warm-up on land would be the best approach ✓ the core temperature reduced by the least «0.1 °C» ✓ the 100 m sprint time showed the greatest improvement compared to the control «-1%» ✓ the time to 15 m showed the greatest improvement compared to the control «-0.4%» ✓		3 max
2.	a	«peripheral» vasoconstriction to areas not being used or outside the core ✓ shivering which is involuntary contractions of skeletal muscles ✓ non-shivering thermogenesis occurs which is an increase in heat production due to increasing cellular metabolic rates ✓ reduction in sweat production ✓		2 max

Question		Answers	Notes	Total
2	b	<p>in water heat is conducted away from the body faster than air ✓</p> <p>heat loss in water is faster when the water is moving due to the convective heat loss «26x faster in water» ✓</p> <p>swimming at high speeds may allow the metabolic rate to increase and compensate for the heat loss ✓</p>	<i>Award [1 max] for a list.</i>	2 max
3.	a	<p>anabolic steroid ✓</p> <p>hormones and related substances ✓</p> <p>diuretics and masking agents ✓</p> <p>beta blockers ✓</p> <p>stimulants ✓</p> <p>blood doping ✓</p>		2 max
3	b	<p>Strengths:</p> <p>reduce tremors/shaking in sports where a steady hand is required</p> <p><b>OR</b></p> <p>increase precision ✓</p> <p>reduce feelings of anxiety ✓</p> <p>increase concentration ✓</p> <p>decrease in blood pressure/heart rate ✓</p> <p><b>(continued ...)</b></p>	<i>Award [2 max] for strengths and limitations.</i>	4 max

Question			Answers	Notes	Total
			<p><b>(Question 3b continued)</b></p> <p>Limitations:</p> <p>can cause cardiac failure / heart attack «if there is an underlying heart issue» ✓</p> <p>hypotension ✓</p> <p>getting caught and banned ✓</p> <p>excessive use maybe related to depression ✓</p> <p>fatigue ✓</p>		

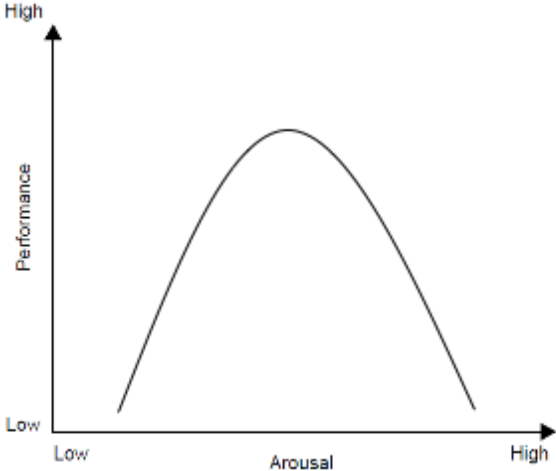
Question			Answers	Notes	Total
4.	a		<p>overtraining is when an athlete attempts to do more training than they are able to physically and/or mentally tolerate ✓</p> <p>overreaching is when an athlete completes a brief period of heavy training that is beyond their current limit of tolerance «in order to stimulate a training response» ✓</p>		2
4	b		<p>use periodization in their exercise plan ✓</p> <p>ensuring that they include rests/days off in their plan to allow for recovery ✓</p> <p>gradually build up the load and intensity of training ✓</p> <p>to include variety in the training programme ✓</p>		2 max

**Option B — Psychology of sports**

Question		Answers	Notes	Total
5.	a	ego/group 2 ✓		1
5	b	6.40 – 5.10 ✓ = 1.30 ✓	<i>Accept answer in the converse.</i>	2
5	c	<p>the task groups focus on performance influenced the behaviour so that they had more prosocial behaviours being exhibited/the least antisocial behaviours across all groups possibly due to team work being an important factor in influencing overall performance ✓</p> <p>the focus on rewarding goal scoring / ego condition negatively impacted on prosocial behaviour / increased antisocial behaviour possibly due to the focus on the outcome/goal scoring which is an individual performance ✓</p> <p>the control group had a more balanced frequency of both behaviours / prosocial and antisocial behaviours possibly because people will be influenced by many different motivating factors when no reward is offered ✓</p>		2 max
6.	a	<p>the internal mechanisms and external stimuli which arouse and direct our behaviour ✓</p> <p>the direction and intensity of a person's effort ✓</p>	<i>Or words to that effect</i>	1
6	b	<p><i>intrinsic motivation</i>: reason for exercise are derived internally (eg enjoyment, knowledge, fun)</p> <p><b>AND</b></p> <p><i>extrinsic motivation</i>: is stimulated from outside/external sources (eg praise from others, money, awards) ✓</p>		1



Question		Answers	Notes	Total
6.	c	<p><i>Strengths</i></p> <p>extrinsic rewards can provide information about quality of performance ✓                      information rewards increase intrinsic motivation ✓</p> <p><i>Limitations</i></p> <p>extrinsic rewards can be seen as controlling behaviour ✓                      controlling rewards reduce intrinsic motivation ✓                      the individual does not have control ✓</p>	<p><i>Award [2 max] for either strengths or limitations.</i></p>	<p><b>3 max</b></p>

Question	Answers	Notes	Total
7. a	<p>the optimum level of arousal for the weightlifter will tend to be high</p> <p><b>OR</b></p> <p>initially as arousal increases performance increases «to an optimum level» ✓</p> <p>above this level of arousal their performance will tend to deteriorate again ✓</p> <p>there will be individual differences in optimal arousal ✓</p> <p>a weightlifter feeling under aroused will tend to perform poorly ✓</p> 	<p><i>Award [1 max] for labelled graph</i></p> <p><b>2 max</b></p>	

Question		Answers	Notes	Total
7.	b	<p><i>Positive emotions:</i></p> <p>excitement masks pain / fatigue / stimulates adrenalin ✓</p> <p>relief could calm the nerves and increase confidence ✓</p> <p>joy creates a positive mindset and makes it more likely that they will be optimally aroused ✓</p> <p>pride will improve motivation and striving to achieve ✓</p> <p><i>Negative emotions:</i></p> <p>anger may mean that the athlete has tunnel vision and miss key cues ✓</p> <p>guilt may mean an athlete does not push themselves and they withdraw in the game ✓</p> <p>fear may mean they may avoid situations and try to avoid contact with others ✓</p> <p>anxiety may mean they are distracted by their own thoughts and miss cues ✓</p> <p>boredom may mean that cues are missed due to arousal being low ✓</p>	Award [2 max] for positive or negative.	3 max
8.	a	<p>confidentiality of data so that subjects are not identified ✓</p> <p>use of results from a group to make broad predictions for how others will behave ✓</p> <p>gaining informed consent to use the results or findings ✓</p> <p>the use of personality data and athlete recruitment ✓</p>		2 max

Question		Answers	Notes	Total
8.	b	<p>an interactionist's approach says that neither nature nor nurture can fully be held accountable for an individual's behaviour/personality ✓</p> <p>personalities are developed «over time» through an interaction between the person and their environment ✓</p> <p>for example: a person may respond positively to an autocratic leadership style when they are new to a team; however, as their experience grows they may become irritated by this approach</p> <p><b>OR</b></p> <p>for example: a performer who has a short fuse may not always show this type of behaviour, given the right environmental triggers they will show these personality traits ✓</p> <p>we can better predict behaviour through knowledge of the specific situation and the ways individuals respond to particular situations ✓</p>	<p><i>Award [2 max] for answer without example.</i></p>	<p><b>3 max</b></p>

**Option C — Physical activity and health**

Question		Answers	Notes	Total
9.	a	couch potatoes/inactive ✓		1
9	b	640–408 ✓ =232 «min day <sup>-1</sup> » ✓	<i>Accept answer in the converse.</i>	2

10.	a	have higher risk of having high blood pressure ✓ higher risk of having type II diabetes ✓ atherosclerosis ✓ higher risk of high blood cholesterol because they aren't burning fats ✓ by carrying extra weight/being obese which puts greater stress on the cardiovascular system to do the same job as someone not overweight ✓ there is a greater chance of comorbidity of factors occurring ✓		3 max
10	b	X= <u>right</u> coronary artery ✓ Y= <u>left</u> anterior <u>descending</u> artery ✓		2

Question		Answers	Notes	Total
11.	a	<p>Habitual physical activity: is any bodily movement produced by contraction of skeletal muscles that substantially increases energy expenditure ✓</p> <p>Exercise: is a subcategory of physical activity where «planned, structured and repetitive» bodily movements are performed to improve or maintain one or more components of fitness ✓</p>	<i>Award [1 max] for each.</i>	2
11	b	a disease associated with physical inactivity ✓		1
11	c	<p>increase in use of motor vehicles reducing the amount of activity undertaken for example, the convenience and speed of going to a local shop is now more likely to be done in a car ✓</p> <p>changes to working patterns, for example, people working shifts may mean that they're working at night and sleeping in the day or are too tired to exercise / means people cannot be at training sessions ✓</p> <p>the use of technology to communicate now means that people can communicate from their room to others in different spaces where they may have had to walk to see these people previously ✓</p> <p>the rise of fast food and deliveries means that people are not as active in their making of food as they may have previously been ✓</p> <p>nature of many occupations has changed so fewer people work in manual jobs and more work in jobs aligned with sedentary behaviour ✓</p>	<i>Award [1 max] for a list of factors.</i>	4 max

Question		Answers	Notes	Total
12.	a	through them joining in with you ✓ through them transporting you to a venue ✓ through providing money for costs or equipment ✓ role model's / coach's / friend's / family's encouragement motivates you to keep being active/involved in exercise ✓		2 max
12	b	whether it is enjoyable or rewarding to the person to boost feelings of achievement/self-esteem ✓ the absence of competition which removes the focus from winning and losing ✓ aerobic exercise enhancing blood flow to the brain which helps to remove wastes and stimulate the brain ✓ rhythmic exercise increases dopamine/serotonin levels/helps to reduce stress/tension ✓ achievability so that the individual is having feelings of success/level of intensity not too high so that success is achieved ✓ resistance training to improve posture which creates noticeable changes in stature ✓ time frame that enables a feeling of having done something ✓		3 max

Option D — Nutrition for sports, exercise and health

Question		Answers	Notes	Total
13.	a	stayed the same ✓		1
13	b	40–25 ✓ 15 cm ✓	Accept answers in the converse.	2
13	c	<p><i>Strengths:</i> dribbling precision is improved through carbohydrate consumption ✓ % success got better between 85 and 105 min / 0–15 min after consumption/initially improved after consumption ✓</p> <p><i>Limitations:</i> % success got worse/decreased between 105 and 120 min / 20–35 min after consumption ✓ dribbling speed was unchanged due to consumption of CHO gel ✓</p>	Award [2 max] for either strength or limitation.	3 max
14	a	it is a ranking system indicating the rate of glucose absorption in blood ✓		1
14	b	<p>increasing stored glycogen delays fatigue ✓</p> <p>Training: complete an exhaustive session approximately 7 days/1 week prior to the event ✓ the training load «intensity and volume» is reduced/tapered over the remaining «6» days ✓</p> <p>Diet: approximately 7 to 4 days prior the diet is low in CHO «high in fat and protein» ✓ this increases the activity of the enzyme glycogen synthase / results in greater glycogen storage when CHO diet increases ✓ the final «3» days has a high CHO diet ✓</p>	<p>Other valid methods to be accepted.</p> <p>Award [2 max] for diet or training.</p>	4 max



Question		Answers	Notes	Total
15.	a	<p>mechanical digestion which involves the teeth breaking up the food into smaller particles / increase surface area of food ✓</p> <p>chemical digestion which is due to the presence of enzymes «amylase» in saliva ✓</p>	<i>Award [1 max] for a list.</i>	2
15.	b	<p><i>Fats:</i></p> <p>«pancreatic» lipase ✓</p> <p><i>Proteins:</i></p> <p>pepsin</p> <p><b>OR</b></p> <p>trypsin</p> <p><b>OR</b></p> <p>protease ✓</p>	<i>Award [1 max] for each.</i>	2

Question		Answers	Notes	Total
16.	a	basal metabolic rate ✓ «thermic effect of» physical activity ✓ «thermic effect of» feeding ✓		2 max
16	b	body composition is composed of 2 main components, fat and fat-free mass ✓ fat-free mass is made up of water, bone and tissues such as muscle ✓ eg for a «marathon» runner/jumper/gymnast they will look to minimise the fat mass as this does not add to power output ✓ for a power athlete like a shot putter/prop in rugby/sumo wrestler a higher level of fat mass does not limit performance ✓	<i>Award [2 max] for answer without example.</i>	3 max