Diploma Programme
Programme du diplôme
Programa del Diploma

Markscheme

May 2016

Sports, exercise and health science

Standard level

Paper 3

17 pages

1. Follow the markscheme provided, award only whole marks and mark only in **RED**.

2. Make sure that the question you are about to mark is highlighted in the mark panel on the right-hand side of the screen.

3. Where a mark is awarded, a tick/check ‹✓› **must** be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark. **One tick to be shown for each mark awarded**.

4. Sometimes, careful consideration is required to decide whether or not to award a mark. In these cases use RM™ Assessor annotations to support your decision. You are encouraged to write comments where it helps clarity, especially for re-marking purposes. Use a text box for these additional comments. It should be remembered that the script may be returned to the candidate.

5. Personal codes/notations are unacceptable.

6. Where an answer to a part question is worth no marks but the candidate has attempted the part question, use the “zero” annotation to award zero marks. Where a candidate has not attempted the part question, use the “SEEN” annotation to show you have looked at the question. RM™ Assessor will apply NR once you click complete.

7. If a candidate has attempted more than the required number of questions within a paper or section of a paper, mark all the answers. RM™ Assessor will only award the highest mark or marks in line with the rubric.

8. Ensure that you have viewed every page including any additional sheets. Please ensure that you stamp “SEEN” on any additional pages that are blank or where the candidate has crossed out his/her work.

9. There is no need to stamp an annotation when a candidate has not chosen an optional question in Section B. RM™ Assessor will apply NR once you click complete.

10. Mark positively. Give candidates credit for what they have achieved and for what they have got correct, rather than penalizing them for what they have got wrong. However, a mark should not be awarded where there is contradiction within an answer. Make a comment to this effect using a text box or the “CON” stamp.

Subject Details: Sports, Exercise and Health Science SL Paper 3 Markscheme

Mark Allocation

Candidates are required to answer 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 ***OR*** 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 wording is indicated in the "Answers" column by a slash ‹/›. Either wording can be accepted.

6. An alternative answer is indicated in the "Answers" column by "**OR**" on the line between the alternatives. Either answer can be accepted.

7. Words in angled brackets **‹ ›** in the "Answers" column are not necessary to gain the mark.

continued…

8. Words that are underlined are essential for the mark.

9. The order of marking points does not have to be as in the "Answers" column, unless stated otherwise in the "Notes" column.

10. 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›.

11. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.

12. 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.

13. 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		mean power post acclimatization ✓	*Units not required.*	**1**
	b		decrease ✓		**1**
	c		17.84 – 17.18 ✓ = 0.66 $W.kg^{-1}$ ✓ ***OR*** 17.18 – 17.84 ✓ = –0.66 $W.kg^{-1}$ ✓	*Units required.* *Award **[1 max]** for calculation, answer and no units.*	**2 max**
	d		increased plasma volume ✓ earlier onset of sweating ✓ more dilute sweat ✓ increased sweating ✓ lower HR ‹at a standardized sub maximal workload› ✓ increased temperature gradient ✓ lower T_c /core temp ‹at a standardized sub maximal workload› ✓ lower skin temperature ‹at a standardized sub maximal workload› ✓ ‹relatively› less blood flow to skin / more blood for active muscles ✓ reduced rate of muscle glycogen usage ✓ more efficient / effective regulation of body temperature/elimination of excess body heat ✓ heat acclimatization takes a period of 9 to 14 days of exercise in the heat ✓	*Award **[1 max]** for listing three adaptations instead of discussing.*	**3 max**

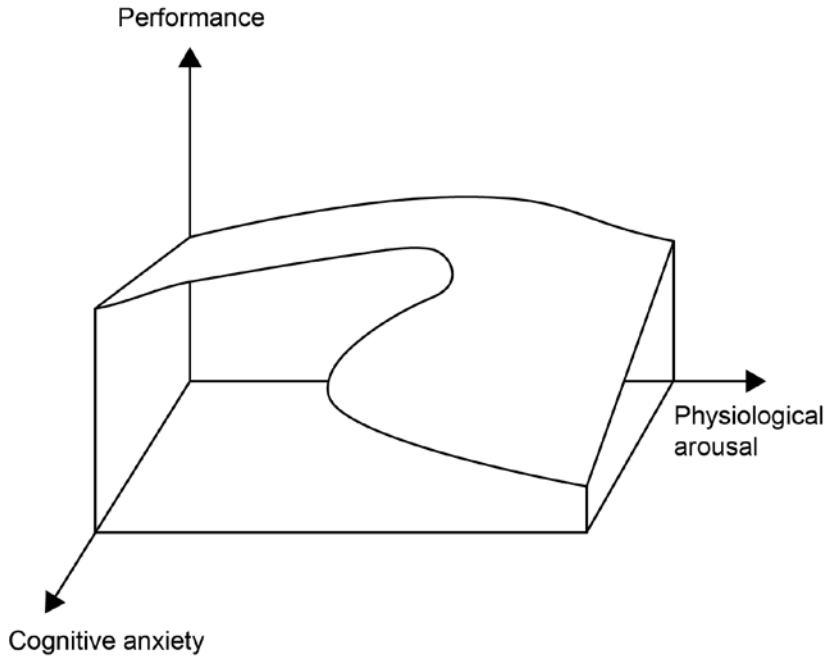
Question			Answers	Notes	Total
2	a		training is performing exercise in an organized manner on a regular basis with a specific goal in mind whereas overreaching is transient / short term overtraining *OWTTE* ✓		1
	b		overtraining is when an athlete attempts to do more training than he or she is able to physically and/or mentally tolerate ✓ *Overtraining can result in the following symptoms:* decreased appetite ✓ body weight loss/fat and muscle loss ✓ muscle tenderness / soreness ✓ nausea ✓ sleep disturbance ✓ elevated resting HR ✓ elevated BP ✓ performance decline ✓ increased susceptibility to infections / reduced immune function ✓ loss of motivation/vigour ✓ lack of mental concentration ✓ feelings of depression ✓ lack of appreciation/enjoyment of training ✓	*Award **[1 max]** for listing three symptoms instead of discussing.*	**3 max**
	c		rapid eccentric muscle action ✓ ‹followed by› immediate concentric muscle action ✓	*Accept ‹rapid› lengthening and ‹immediate› shortening of muscle.*	**2 max**

Question			Answers	Notes	Total
3	a		anabolic steroids ✓ hormones and related substances ✓ diuretics ✓ beta blockers ✓ stimulants ✓	http://www.ukad.org.uk/resources/document/the-prohibited-list-2016	**2 max**
	b		personality change / aggressive behaviour ✓ early closure of epiphyses ‹of long bones› ✓ testicular atrophy / reduced sperm count ‹males› ✓ prostate gland enlargement ‹males› ✓ disrupts ovulation / menstruation ‹females› ✓ breast regression / enlargement of clitoris / deepening of voice/facial hair ‹females› ✓ liver damage ✓ diseased heart muscle ✓ depressed HDL/atherosclerosis ✓		**2 max**
	c		excrete water for rapid weight loss ✓ meet a weight category/transiently reduce body weight in weight-class sports ✓ used by athletes who believe that a lighter body will enhance their performance ‹*eg* gymnasts / dancers› ✓ increase urine volume to flush out banned substances ✓ dilute/mask concentration of banned substance‹s› in urine making it more difficult to detect / allows athletes taking an illegal drug to compete ✓ help prevent AMS / acute mountain sickness for athletes participating / competing at high altitude ✓		**3 max**

Option B — Psychology of sport

Question			Answers	Notes	Total
4	a		IVI ✓		1
	b		increases ✓		1
	c		87.45 – 86.23 ✓ = 1.22 seconds ✓ ***OR*** 86.23 – 87.45 ✓ = –1.22 seconds ✓	*Units required.* *Award **[1 max]** for calculation, answer and no units.*	2 max
	d		nature of the task / cognitive components ‹*eg* decision making / perception› show greatest benefits ✓ skill level of performer / stronger effects for more experienced athletes ✓ imaging ability / more effective when individuals are higher in their ability to imagine ✓ imagery does not take the place of physical practice ***OR*** combination of physical and mental practice is not better than physical practice alone ✓ mental practice improves performance more than no practice at all ✓ injured / over trained, mental practice is useful as a substitute for physical practice ✓ to be effective ‹mental imagery› must be incorporated as a regular part of training ✓	*Award **[1 max]** for identification of three factors.* *Accept answers from the PETTLEP* model ✓ ‹https://core.ac.uk/download/pdf/273559.pdf›	3 max

Question			Answers	Notes	Total
5	a		those relatively stable and enduring aspects of individuals which distinguish them from other people, making them unique but at the same time permit a comparison between individuals *OWTTE* ✓		1
	b		distinction between psychological traits and states / typical behaviour ‹traits› and situation's effects on behaviour ‹states› ✓ fluctuations before and during competition ✓ limitations of data collection method ‹interviews, questionnaires, observations› ✓ valid tests reliably developed can have measurement error ✓		2 max
	c		social learning theory explains behaviour in terms of observational learning ‹modelling› and social reinforcement ‹feedback› ✓ *Specific attitudes and behaviours toward sport and exercise are learned:* through modelling / observational learning ✓ reinforcement ✓ social comparison ✓ people's social learning history determines their attitudes and behaviour in sport and exercise settings ✓ can have a positive / negative effect on sport and exercise behaviour ✓ sport / exercise example ✓		3 max

Question			Answers	Notes	Total
6	a			*Award **[1]** for two correct labels and **[2]** for three correct labels.*	**2**

	b		sporting example of somatic ✓ sporting example of cognitive ✓ *eg* golf: somatic anxiety is a physical component of anxiety *eg* produces a shake when putting. Cognitive anxiety is a thought component *eg* produces negative thoughts about the outcome of a shot.	*Sport selected must be the same for both somatic and cognitive.*	**2**
	c		phase between the education and practice phases ✓ focus on strategies / techniques for learning the psychological skills ✓ needs analysis of the athlete ✓ formal / informal meetings to evaluate athlete's progress ✓ teaching / learning specific strategies to performer's unique needs and abilities ✓ individual sessions to practice or apply strategies ✓ exercise performance example ✓ *eg* goal setting involves deliberately establishing/refining and evaluating progress towards a goal such as a person weight training might set a goal to improve squat technique. *eg* enhances exercise performance if able to use PST on their own ‹*ie* self-regulate›		**3 max**

Option C — Physical activity and health

Question			Answers	Notes	Total
7	**a**		weekends ✓		**1**
	b		decreases ✓		**1**
	c		$8.35 + 2.15 + 0.82$ ✓ $= 11.32$ ✓		**2**
	d		physical inactivity is associated with increased risk of morbidity / worsening of many chronic diseases/health conditions, in particular cardiovascular disease ✓ sedentary pursuits, independent from overall physical activity levels, are adversely associated with metabolic risk factors ✓ physically inactive people should both reduce sedentary activity and increase regular physical activity for optimal cardiovascular health/to help prevent cardiovascular disease ✓ a lifestyle of physical inactivity increases the following risk factors for cardiovascular disease: high blood pressure, obesity, type 2 diabetes, low HDL cholesterol ✓	*Accept answers in the converse.*	**3 max**

Question			Answers	Notes	Total
8	a		‹coronary› heart disease ✓ stroke ✓ hypertension ✓ obesity ✓ ‹type 2› diabetes ✓ osteoporosis ✓		**2 max**
	b		the introduction of the motor vehicle ✓ changes in employment, jobs are more office based leading to increasing sedentary bouts ✓ changes in diet including increase in fast food resulting in higher saturated fats and sugars ✓ technological devices reducing manual labour ✓ children spending greater number of hours playing computer games and watching TV ✓ urbanisation/high density living reducing recreational space ✓		**3 max**
9	a		Type 1 involves destruction of the β-cells in the pancreas whereas type 2 is characterised by impaired glucose tolerance because of insulin resistance ✓ Type 1 may or may not be improved with exercise whereas type 2 responds well to exercise ✓ Type 1 generally has a sudden onset during childhood or young adulthood whereas the onset of type 2 is more gradual ✓ Type 1 is normally inherited whereas type 2 is often acquired via lifestyle ✓		**1**
	b		obesity plays a major role in the development of type 2 diabetes ✓ associated with physical inactivity ✓ associated with a diet high in saturated fat / sugar ✓ genetics/heredity is a factor in the development of type 2 diabetes ✓ risk factors are modifiable for type 2 diabetes ✓		**3 max**

Question			Answers	Notes	Total
10	a		a state of emotional or affective arousal of varying, and not permanent, duration *OWTTE* ✓		1
	b		the relationship is correlational *ie* there is no causal link ✓ increases cerebral blood flow and oxygen supply to the brain ✓ increases endorphin production during and after exercise which promote feelings of well-being ✓ changes central serotonergic systems/increases serotonin levels from exercise which contributes to feelings of well-being and happiness ✓ increases the neurotransmitter noradrenaline heightening sense of alertness and vigour ✓ dopamine levels increase due to exercise ✓ improved self-image/esteem ✓	*OWTTE applies to all marking points.*	3 max

Option D — Nutrition for sport, exercise and health

Question			Answers	Notes	Total
11	**a**		high ‹training volume› and individual ‹sports› ✓		**1**
	b		increased intake / increased intake ‹for both individual and team sports› ✓		**1**
	c		63.2 – 47.6 ✓ = 15.6 ‹%› ✓		**2**
	d		improved performance capacity in anaerobic events ✓ increased buffering capacity of lactic acid ✓ ‹extracellular› pH maintained ‹as active muscles release greater amounts of lactic acid› ✓ high-intensity exercise continues for longer ✓ associated with gastrointestinal discomfort in some athletes ✓		**3 max**
12	**a**		Pepsin ✓ trypsin ✓ trypsinogen / chymotrypsinogen / carboxypeptidase ✓		**2 max**
	b		receptor / input to control centre / nerve impulses / chemical signals ✓ *eg* changes in salt concentration are detected by receptors. control centre / sets range of values/evaluates input / generates output command ‹nerve or chemical› / to effector ✓ *eg* message is received at the hypothalamus that the salt concentration has changed. effector / receives output from control centre / produces response ✓ *eg* pituitary gland adjusts the output of ADH. the result of the response is constantly being monitored by receptors and if the desired state is attained the control centre will stop sending the command ✓	*Award **[1 max]** for definition of homeostasis.* *Accept flow diagram.*	**3 max**

Question			Answers	Notes	Total
13	a		provides aqueous/water medium essential for all metabolic processes/reactions in the body ✓ helps to regulate body temperature ✓ provides transportation between and delivery to the body's tissues ✓ helps to maintain blood pressure ✓ enables cell to cell communication ✓ lubricates joints ✓ allows the body to rid itself of wastes ‹excretion› ✓ water constitutes about 50 % ‹young adult female› and 60 % ‹young adult male› total body weight ✓		**2 max**
	b		fat-free mass desirable for marathon runners ‹muscular endurance› ✓ large fat-free mass made up of muscle is undesirable for marathon runner / additional load impairs performance/they tend to be leaner in body shape ✓ relative body fat / higher percentage of fat mass the poorer the performance of the marathoner ✓ relatively light / low body mass desirable for marathon runners ✓		**2 max**
14	a		the ranking system for carbohydrates based on their immediate effect on blood glucose concentrations when compared with a reference food such as pure glucose ✓		**1**
	b		protein requirements are higher for individuals in training ✓ strength training individuals need up to 1.6 g/kg per day / approximately twice RDA / strength training requires additional amino acids for protein synthesis ✓ athletes in endurance training need 1.2 to 1.4 g/kg per day ‹depending on training intensity› / endurance training places greater demand on protein to increase mitochondrial content / endurance training places greater demand on protein as a fuel ✓ protein ‹about 20 g› should be consumed early during the post-training recovery phase ‹immediately to two hours after exercise› / protein intake aids muscle recovery from training ✓		**3 max**