

## **GCSE**

### **Physical Education (9–1)**

Unit **J587/01**: Physical factors affecting performance

General Certificate of Secondary Education

### **Mark Scheme for June 2018**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations used in the detailed Mark Scheme

Annotation	Description	Annotation	Description
	Tick	<b>KU</b>	Knowledge and understanding / indicates AO1 on extended response Q (*)
	Cross	<b>EG</b>	Example/Reference / indicates AO2 on extended response Q (*)
<b>BOD</b>	Benefit of doubt	<b>DEV</b>	Development / indicates AO3 on extended response Q (*)
<b>TV</b>	Too vague	<b>L1</b>	Level 1 response on extended response Q (*)
<b>REP</b>	Repeat	<b>L2</b>	Level 2 response on extended response Q (*)
<b>IRRL</b>	Significant amount of material which doesn't answer the question	<b>L3</b>	Level 3 response on extended response Q (*)
<b>SEEN</b>	Noted but no credit given / indicates sub-max reached where relevant	<b>S</b>	Sub-max reached

Available but not used: 'BP' (blank page) – 'SEEN' is used

- **KU, EG and DEV** used instead of ticks on the extended response question to indicate where knowledge or development points from the indicative content have been made.
- On the extended response question (\*), one KU, EG or DEV does not necessarily equate to one mark being awarded; the marking is based on a levels of response mark scheme which awards a level and mark holistically based upon the quality of the response overall against the levels descriptors.

Section A				
Question	Answer	Marks	Guidance	
1	Two from two of: 1. Allows gaseous exchange/diffusion 2. Allows oxygen to diffuse/move into the blood/capillaries 3. Allows carbon dioxide to diffuse/move from the blood/capillaries	<b>2</b> 2 x (AO1)	Pts 2 and 3 require direction of gas to be correct Into lungs/alveoli is TV Oxygen diffusion into blood is 2 marks (pt. 1 and 2)	
2	<b>D</b> or pulmonary vein <b>OR</b> vena cava (is incorrectly labeled)	<b>1</b> 1 x (AO1)		
3	One mark for: 1. Freely moveable/allow for movement	<b>1</b> 1 x (AO1)		
4	Two from two of: 1. Humerus 2. Scapula	<b>2</b> 2 x (AO2)	Mark first 2 responses only Accept: phonetic spellings	
5	Two from two of: 1. (Explanation) – Any performance/fitness gain that has occurred through training can be lost once training has stopped <b>OR</b> training must be maintained to prevent loss of performance/fitness 2. (Example) – appropriate practical example demonstrating reversibility	<b>2</b> 1 x (AO1) 1 x (AO2)	Do not accept: any reference to physical adaptations/gains are <b>reversed</b> (in question) Go back to where they were = TV If practical example is correct, as in pt 2, and shows explanation through e.g. then award 2 marks e.g. A weightlifter will lose their strength gained (1 x AO2) if they have been unable to lift weights for a while (1 x AO1) (due to injury)	
6	<b>C.</b> 20m for the multi-stage fitness and 30m for the speed test	<b>1</b> 1 x (AO1)		
7	Two from two of: Muscle A - Gastrocnemius Bone B - Tibia	<b>2</b> 2 x (AO1)	Accept phonetic spellings for each Do not accept: tibula or fibia for B or calf or shin	

Section A			
Question	Answer	Marks	Guidance
8	<p>Two marks for two of:</p> <ol style="list-style-type: none"> <li>Slippery/hard/wet/damaged surface (in or around the pool)</li> <li>Loose fittings <b>OR</b> equipment left out</li> <li><b>Too much</b> chlorine/chemicals in pool</li> <li>Overcrowded pool</li> <li>(Ability/behaviour of) other swimmers</li> <li>Depth of water/deep/shallow</li> <li>Dirty water/poor water quality/litter/debris/waste</li> </ol>	<p><b>2</b> 2 x (AO1)</p>	<p>Mark first 2 responses only Do not accept: consequences of hazard e.g. slipping/falling/drowning/collisions Water/chlorine on its own = TV</p>
9	<p>Three from three of:</p> <ol style="list-style-type: none"> <li>Transverse is side to side/hip to hip/left to right <b>and</b> longitudinal is top to bottom/head to toe</li> <li>(transverse) e.g. somersault/biceps curl/pedalling a bicycle</li> <li>(longitudinal)e.g. pirouette/full turn/flat spin/twirl</li> </ol>	<p><b>3</b> 3 x (AO3)</p>	<p>Accept: diagram if both axes are correct for 1 Do not accept: front to back (for transverse) Transverse is movement in sagittal plane (flexion/extension) and longitudinal is movement in transverse plane</p>
10	<p>One mark from:</p> <ol style="list-style-type: none"> <li>(activity) any activity/event that requires aerobic energy production e.g. marathon/triathlon/800m+</li> <li>(time) To achieve a faster time in an (mainly aerobic) event/activity</li> <li>(performance) Remain effective during a game/less fatigue during performance</li> </ol>	<p><b>1</b> 1 x (AO2)</p>	<p>Running/cycling/swimming on its own = TV Long distance run/swim/cycle = BOD Do not accept a named performer e.g. Mo Farah</p>

Section A				
Question		Answer	Marks	Guidance
11	(a)	One mark for: 1. Main/specific/different <b>muscles</b> (targeted at each station) <b>OR</b> involves repetition (reps) of exercises <b>OR</b> body weight is usually the resistance <b>OR</b> each station is timed <b>OR</b> rest period between each station	<b>2</b> 1 x (AO1)	Train different parts of the body = TV Intense exercise followed by not as intense = TV Rest at the end = TV
	(b)	Accept any combination that includes at least 2 arm exercises (bicep curls, pull ups, press ups)	1 x (AO2)	
12		Two from two of: 1. Protects the knees/bones <b>OR</b> prevents friction <b>OR</b> prevents bones rubbing/knocking together <b>OR</b> prevent wear and tear 2. Acts a shock absorber/absorbs impact (of running) 3. Provides support /stability 4. Provides (some) flexibility 5. Aids mobility/movement at the joint 6. Helps to connect some bones (at cartilaginous joints) 7. Keeps airways open	<b>2</b> 2 x (AO3)	Look for a description rather than single word lists
13		3 <sup>rd</sup> class lever	<b>1</b> 1 x (AO3)	Accept: 3 on its own
14		True	<b>1</b> 1 x (AO3)	

Section A				
Question	Answer	Marks	Guidance	
15	C. A common hazard in rugby is concussion	1 1 x (AO1)		
16	Transverse (plane)	1 1 x (AO1)		
17	Two from two of: 1. Jogging/whole body exercise/low intensity movements/slow dance 2. Stretching	2  2 x (AO1)	N.B. Exercises may be in either order	
18	One mark for: 1. Age/gender/weight/ranking/grading/skill/ability level Examples - Boxing occurs in weight categories – e.g. you won't have a heavyweight boxer fighting against a light boxer Football – less likely to be injured in a tackle if all participants same/similar age	1 1 x (AO2)	Level of competition must be linked to a practical example	
19	A= Effort <b>and</b> B = Load	1 1 x (AO2)	N.B. 1 mark so only 1 tick Accept: Resistance for <b>B</b> = BOD	
20	False	1 1 x (AO1)		

Section B				
Question		Answer	Marks	Guidance
21	(a)	<p>5 marks for 5 of:</p> <ol style="list-style-type: none"> <li>1. Increase in heart rate/HR</li> <li>2. Increase in stroke volume/SV</li> <li>3. Increase in cardiac output/Q</li> <li>4. <b>Increases</b> blood flow/oxygen to (working) muscles</li> <li>5. directs blood away from other organs <b>OR less</b> blood to other organs</li> <li>6. Increase in blood pressure due to the increase in demand for oxygen (from the working muscles)</li> <li>7. <b>Increase in blood</b> lactate/lactic acid/CO<sub>2</sub> because muscles are working</li> <li>8. Blood temperature increases to help control of body temperature</li> <li>9. Vascular shunt <b>OR</b> vasodilation of blood vessels to muscles <b>OR</b> vasoconstriction of blood vessels to other organs</li> </ol>	<p><b>5</b></p> <p>5 x (AO2)</p>	<p>Do not accept: long-term adaptations e.g. stronger heart</p> <p>Pt 4 - Blood flows to muscles = TV as need <b>more/increase</b></p> <p>More blood to arms/legs = BOD pt. 4</p> <p>Lactic acid builds up in muscles – TV Lactic acid produced – TV LA found in the blood – TV</p>
	(b)	(i)	<p>1 mark for: (Muscular hypertrophy) – muscle will increase in size/mass/growth</p>	<p><b>5</b></p> <p>1 x (AO1)</p> <p>Do not accept: Hypertrophy of muscle (in question)</p>



Section B			
Question	Answer	Marks	Guidance
	(ii) 4 marks for 4 of: 1. Increase in power/strength (including tendon strength) 2. Increase in speed 3. Increase in (muscular) endurance <b>OR</b> increased resistance to fatigue <b>OR</b> go for longer 4. Increase in flexibility/range of movement/less chance of injury 5. Increase tolerance to lactic acid <b>OR</b> higher/delayed anaerobic threshold 6. Increased rate of removal of lactic acid 7. Increased/reduced/quicker recovery rate 8. Increased capillarisation <b>at the muscles</b>	4 x (AO1)	Muscles become faster = TV The performer becomes quicker = BOD  LA to be removed = TV
22	(a) 1 mark for: Reaction time: The length of time it takes a performer to respond to a stimulus <b>OR</b> the time between the onset of the stimulus and the initiation of the response / movement  1 mark for: Importance: (The quicker the sprinter can respond/react to the gun) the quicker they will get away from the blocks <b>OR</b> have an advantage over their opponents  1 mark for: Speed: The ability to move quickly <b>OR</b> distance divided by time <b>OR</b> rate of change of position with respect to time	<b>4</b> 2 x (AO1) 2 x (AO2)	Do not accept "react" in definition of reaction time. Must use an equivalent word e.g. respond/move. But OK to use "react" in example Look for the <b>importance</b> of the fitness component to a <b>sprinter</b> in examples, or sprinting is implied. Need to react quickly to the gun is TV. <b>It does not explain the importance.</b>

Section B			
Question	Answer	Marks	Guidance
	1 mark for: Importance: (The quicker they are able to move their body/legs/run) the greater the chance of winning the race/getting a faster time		
<b>22 (b)*</b>	<p><b>Level 3 (5–6 marks)</b></p> <ul style="list-style-type: none"> <li>• detailed knowledge &amp; understanding</li> <li>• clear and consistent practical application of knowledge &amp; understanding</li> <li>• effective analysis/evaluation and/or discussion/explanation/development</li> <li>• relevant information drawn upon from other areas of the specification</li> <li>• accurate use of technical and specialist vocabulary</li> <li>• there is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</li> </ul> <p><b>Level 2 (3–4 marks)</b></p> <ul style="list-style-type: none"> <li>• satisfactory knowledge &amp; understanding</li> <li>• some success in practical application of knowledge &amp; understanding</li> <li>• analysis/ evaluation and/or discussion/explanation/development attempted with some success</li> <li>• some relevant information drawn upon from other areas of the specification</li> <li>• technical and specialist vocabulary used with some accuracy</li> <li>• there is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.</li> </ul> <p><b>Level 1 (1–2 marks)</b></p>	<p><b>6</b></p> <p>2 x (AO1)</p> <p>2 x (AO2)</p> <p>2 x (AO3)</p>	<p><b>Level 3 Discriminators</b></p> <ul style="list-style-type: none"> <li>• AO1, AO2 and AO3 are well covered.</li> <li>• Detailed understanding of most components of a warm up, with clear examples of suitable exercises linked to a sprinter.</li> <li>• Good knowledge of mental preparation techniques with some evaluation of their benefits</li> <li>• There may be some imbalance between the two parts of the question for 5 marks.</li> <li>• At 6 marks, both aspects are well addressed with some specific evaluation of at least 2 mental preparation techniques</li> </ul> <p><b>Level 2 Discriminators</b></p> <ul style="list-style-type: none"> <li>• Some success at more developed AO2 and/or AO3 points</li> <li>• Good understanding of some components of a warm up, with some examples of suitable exercises</li> <li>• Some knowledge of mental preparation techniques is shown at the top of L2</li> </ul> <p><b>Level 1 Discriminators</b></p> <ul style="list-style-type: none"> <li>• Responses demonstrate basic AO1 or AO2 knowledge and understanding</li> <li>• A limited description that may include an example of one or two components of a warm up</li> </ul>

Section B			
Question	Answer	Marks	Guidance
	<ul style="list-style-type: none"> <li>• basic knowledge &amp; understanding</li> <li>• little or no attempt at practical application of knowledge &amp; understanding</li> <li>• little or no attempt to analyse/ evaluate and/or discuss/explain/develop</li> <li>• little or no relevant information drawn upon from other areas of the specification</li> <li>• technical and specialist vocabulary used with limited success</li> <li>• the information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</li> </ul> <p><u>Components</u></p> <ol style="list-style-type: none"> <li>1. Pulse raiser - any exercise that increases heart rate <ul style="list-style-type: none"> <li>• Jogging on the spot/light jogging</li> </ul> </li> <li>2. Mobility – any exercise that takes joint through full range of movement <ul style="list-style-type: none"> <li>• Arm swings/hip circles/ankle rotations</li> </ul> </li> <li>3. Dynamic – any exercise that involves change of speed and direction <ul style="list-style-type: none"> <li>• Shuttle runs/agility runs</li> </ul> </li> <li>4. Stretching – any exercise that increases range of movement/ reduces risk of injury <ul style="list-style-type: none"> <li>• Static stretches – e.g. hamstrings stretch, etc.</li> <li>• Dynamic stretches – e.g. lunges</li> </ul> </li> <li>5. Skill Rehearsal – any exercise that prepares performer for the race by replicating elements of the race <ul style="list-style-type: none"> <li>• Short 10m sprints/practice their starting technique</li> </ul> </li> </ol>		<ul style="list-style-type: none"> <li>• Little or no attempt to identify mental preparation techniques <b>(0 marks)</b></li> <li>• No response or no response worthy of credit.</li> </ul> <p><b>Question:</b> <i>Using practical examples, describe the components of a warm up and evaluate the different mental preparation techniques that could be used to fully prepare the athlete for the race.</i></p> <p><b>Annotations:</b></p> <p><b>Use KU for numbered points = AO1</b>  <b>Use EG for examples related to sprinting = AO2</b>  <b>Use DEV for evaluations of mental preparation techniques = AO3</b>  <b>Use SEEN for examples not applied to sprinter</b></p> <p><b>N.B. General evaluations about mental preparation techniques are valid but some evaluation specific to the technique(s) is needed to achieve top of level 3</b></p>

Section B			
Question	Answer	Marks	Guidance
	<p><u>Mental Preparation Techniques</u></p> <p>6. Imagery</p> <ul style="list-style-type: none"> <li>• Heightens or controls arousal levels (AO3)</li> <li>• E.g. The athlete using imagery to keep calm/get in the zone before the race</li> </ul> <p>7. Mental rehearsal</p> <ul style="list-style-type: none"> <li>• Allows effective / clear / safe decision making (AO3)</li> <li>• E.g. The athlete visualises the sprint start</li> <li>• Both imagery/mental rehearsal can speed up reactions (AO3)</li> </ul> <p>8. Selective attention</p> <ul style="list-style-type: none"> <li>• improves concentration/focus or blocks out distractions (AO3)</li> <li>• e.g. An athlete uses selective attention to concentrate on the upcoming race</li> </ul> <p>9. Positive thinking</p> <ul style="list-style-type: none"> <li>• Increases motivation/confidence/self-awareness (AO3)</li> <li>• E.g. The athlete believes they are going to win/qualify for the race <b>or</b> telling themselves they are going to have a good start from the blocks</li> </ul> <p>10. (General evaluations of mental preparation) (AO3)</p> <ul style="list-style-type: none"> <li>• Heightens/controls arousal</li> <li>• Improves decision-making</li> <li>• Speeds up reactions</li> <li>• Improves focus/concentration or blocks out distractions</li> <li>• Increases confidence/motivation/self-awareness</li> </ul>		

Section B			
Question	Answer	Marks	Guidance
23 (a)	<p>Three marks for 3 of:</p> <ol style="list-style-type: none"> <li>1. A has a lower resting respiratory rate <b>or</b> B has higher resting respiratory rate</li> <li>2. A may be fitter (than B) <b>or</b> B may be less fit than A</li> <li>3. A does a warm up <b>or</b> B does not do a warm up</li> <li>4. A may not be working as hard as B <b>or</b> B working harder than A</li> <li>5. Suitable reference to different playing positions for A <b>and</b> B, e.g. player A may be in defence while B may be a midfield player</li> <li>6. A does a cool down <b>or</b> B does not do a cool down</li> <li>7. Both players have (almost) returned to resting respiratory rates after 15 minutes</li> </ol>	<p><b>3</b> 3 x (AO3)</p>	<p>Points 2 – 4 do not need reference to A and B e.g. B does not do a warm up = ✓ Do not accept: A is fit on its own = TV</p>
(b)	<p>Four marks for 4 of:</p> <ol style="list-style-type: none"> <li>1. (External) intercostals contract</li> <li>2. Diaphragm contracts/flattens</li> <li>3. This pulls or moves the rib cage up/out</li> <li>4. Increasing the volume of the thoracic cavity/thorax/lungs</li> <li>5. Decreasing the pressure within thoracic cavity/thorax/lungs <b>or</b> pressure within thoracic cavity is less than atmospheric pressure</li> </ol>	<p><b>4</b> 2 x (AO1) 2 x (AO2)</p>	<p>N.B. If during expiration contraction of respiratory muscles = X Do not accept: More space in lungs = TV Decrease in pressure on its own = TV</p>

Section B				
Question		Answer	Marks	Guidance
	(c)	<p>(Performance) (sub-max 2 marks)</p> <ol style="list-style-type: none"> <li>1. Causes fatigue in the <b>muscles</b></li> <li>2. Causes pain/discomfort/soreness/aches</li> <li>3. resulting in decrease in performance</li> <li>4. Player A's warm up may mean less lactic acid build up</li> </ol> <p>(Recovery) (sub-max 2 marks)</p> <ol style="list-style-type: none"> <li>5. Recovery will be longer if more lactic acid has built up <b>OR</b> slows down recovery rate</li> <li>6. lactic acid causes HR/BR to stay higher than normal</li> </ol>	<p><b>3</b></p> <p>3 x (AO3)</p>	<p>N.B. Sub-max 2 for points about effect of lactic acid on performance and recovery</p> <p>Do not accept: cramp</p>

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