GCE

Physical Education

H555/01: Physiological factors affecting performance

A Level

Mark Scheme for June 2024

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

MARKING INSTRUCTIONS

PREPARATION FOR MARKING
RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to RM Assessor and mark the **required number** of practice responses ("scripts") and the **number of required** standardisation responses.

   YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or the RM Assessor messaging system, or by email.

5. **Crossed Out Responses**
   Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

Rubric Error Responses – Optional Questions
Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses
When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).
When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses
When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)
Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there, then add a tick to confirm that the work has been seen.

7. Award No Response (NR) if:
   - there is nothing written in the answer space

   Award Zero '0' if:
   - anything is written in the answer space and is not worthy of credit (this includes text and symbols).

   Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The RM Assessor **comments box** is used by your team leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
   If you have any questions or comments for your team leader, use the phone, the RM Assessor messaging system, or e-mail.

9. *Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.*

10. For answers marked by levels of response: Not applicable in F501
    a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
    b. **To determine the mark within the level**, consider the following

Descriptor	Award mark
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

1. Annotations used in the detailed Mark Scheme

Annotation	Description	Annotation	Description
	Tick	KU	Knowledge and understanding / indicates AO1 on Q9
	Cross	EG	Example/Reference / indicates AO2 on Q9
BOD	Benefit of doubt	DEV	Development / indicates AO3 on Q9
TV	Too vague	L1	Level 1 response on Q9
REP	Repeat	L2	Level 2 response on Q9
S	Indicates sub-max reached where relevant	L3	Level 3 response on Q9
SEEN	Noted but no credit given	L4	Level 4 response on Q9
IRRL	Significant amount of material which doesn't answer the question	BP	Blank page

- Sub-maxes are indicated with **S**; the guidance section of the mark scheme shows which questions these are relevant to.
- **KU/EG/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 this extended response question, one KU/EG/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.

<table>
<tr><th colspan="5">Section A</th></tr>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td></td><td></td><td>Two marks from:
<table><tr><td>1. Agonist</td><td>Rectus femoris or Vastus lateralis or vastus medialis or vastus intermedius</td></tr><tr><td>2. Plane</td><td>Sagittal</td></tr></table></td><td>2
(AO1)</td><td>Accept: first response only</td></tr>
<tr><td>2</td><td></td><td></td><td>Two marks from:
<table><tr><td>1. (Cross sectional area of the muscle)</td><td>The larger the cross-sectional area/girth of the muscle, the greater the strength</td></tr><tr><td>2. (Muscle fibre type)</td><td>The more type 2b/fast glycolytic/FG/2a/fast oxidative glycolytic/FOG/fast twitch fibres in a muscle, the greater the strength</td></tr><tr><td>3.(Gender/hormones)</td><td>(on average) Males have higher strength than females or higher levels of testosterone increase muscle mass/strength</td></tr><tr><td>4. (Age)</td><td>Strength peaks at/declines after 18-30 years of age</td></tr></table></td><td>2
(AO1)</td><td>Mark first two responses only.
Accept:
opposites for pts 1,2,3.
Other terms for maximum strength e.g. force of contraction/ force produced
Do not accept:
One-word answers, need the relationship
Strength declines with age/ strength increases with age – TV</td></tr>
</table>

<table>
<tr><th colspan="5">Section A</th></tr>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>3</td><td></td><td></td><td>Two marks from:

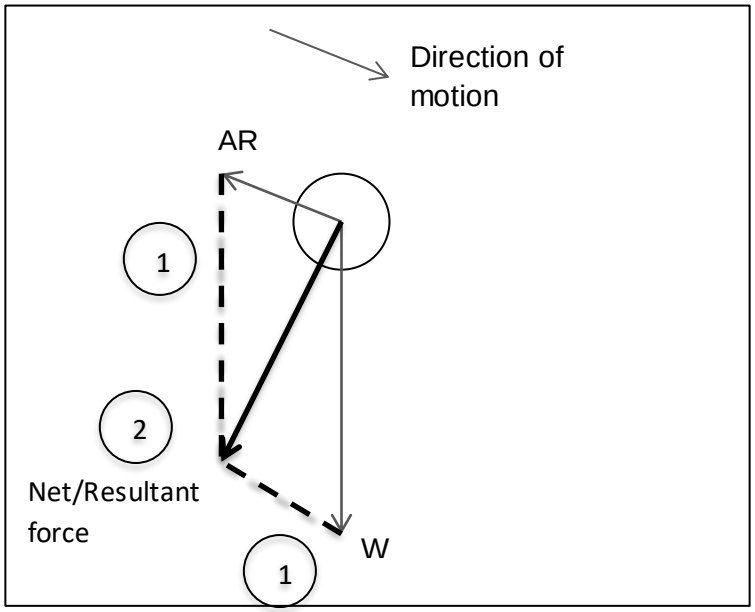
1 mark for:

<table>
<tr><td>1. (Definition)</td><td>Training is structured/organised/split/divided into blocks/periods/phases/cycles (each with a goal and time frame)</td></tr>
</table>

1 mark from:

<table>
<tr><td>2. (Peaking)</td><td>Reach peak performance/fitness/taper at the right time</td></tr>
<tr><td>3. (Injury free)</td><td>Reduce the risk of injury/burnout /overtraining/poor training and preparation</td></tr>
<tr><td>4. (Adapt)</td><td>Training can be adapted to react to situations/setbacks/injury</td></tr>
<tr><td>5. (Goals)</td><td>Set realistic/achievable goals
or increase motivation/focus
or monitor progress more easily</td></tr>
</table>
</td><td>2
(1 x AO1
1 x AO3)</td><td></td></tr>
</table>

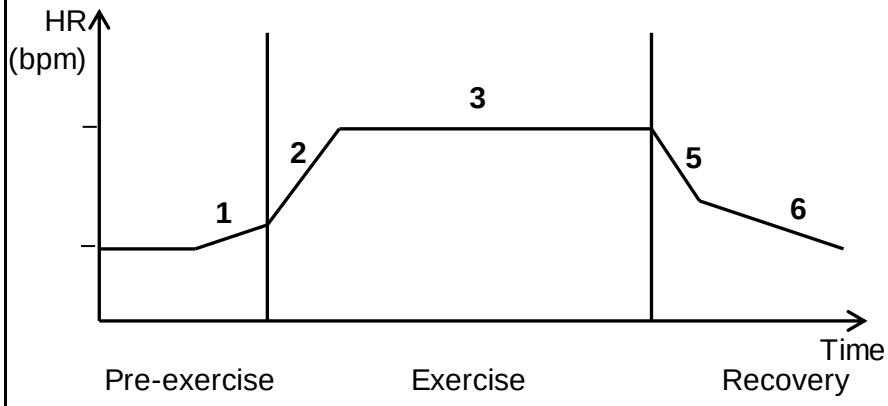
<table>
<tr><th colspan="5">Section A</th></tr>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4</td><td></td><td>(a)</td><td>One mark for:
<table><tr><td>(Description)</td><td>The sum of all forces acting on a body/object
or the overall/resultant force acting on a body</td></tr></table></td><td>1
(1 x AO1)</td><td></td></tr>
<tr><td></td><td></td><td>(b)</td><td>One mark from:
<table><tr><td>1 (Zero example)</td><td>Zero net force on a football causes it to remain stationary on the penalty spot
Or
Zero net force on a runner causes them t2
2o remain at constant velocity</td></tr><tr><td>2 (Positive example)</td><td>(vertical forces e.g.)
Upward/positive net force/reaction greater than weight/R>W on a netball player causes them to jump/take off/accelerate upwards
Or
(horizontal forces e.g.)
Forward/positive net force/friction greater than air resistance/F>AR on a runner causes them to accelerate
Or
Forward/positive net force forward on a tennis ball causes it to accelerate from the racquet
Or
Sideways net (friction) force on a rugby player (during a sidestep) causes them to change direction/accelerate sideways</td></tr><tr><td>3 (Negative example)</td><td>(Negative)
Backwards/negative net force/air resistance greater than friction/ AR>F on a runner causes them to decelerate</td></tr></table></td><td>1 (1 x AO2)</td><td>No practical example no mark
Accept:
any suitable example of zero, positive or negative net force.
Example must show <u>effect of</u> zero, positive, or negative net force
Note:
Accelerate/increase in speed/speed up.
Do not accept: travels forwards/ move for accelerate (could be constant)</td></tr>
</table>

5			Two marks from: 1. (Parallelogram) – (Dashed) lines parallel to W and AR to form parallelogram (see below) 2. (Net/ resultant force) – Arrow from origin of W/AR diagonally to opposite corner of parallelogram labelled net force/resultant force/resultant/RF  	**2** (AO2)	**Accept:** Pt. 2 if net (resultant) force arrow goes to diagonal corner of any quadrilateral shape drawn (i.e. not necessarily a parallelogram) – do not carry error forward. Pt.2 need to show arrowhead and label Pt.2 accept a double arrow as alternative for label 'net force'

<table>
<tr><th colspan="5">Section B</th></tr>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6</td><td>(a)</td><td></td><td>Four marks from:

<table><tr><td>1.(Impulse)</td><td>(Nerve/electrical) impulse/stimulus/action potential travels down the axon/motor neuron/nerve</td></tr><tr><td>2. (Depolarisation)</td><td>Movement of sodium/NA+(ions) into the axon causes depolarisation</td></tr><tr><td>3. (Threshold)</td><td>If the stimulus/impulse/charge is above/reaches a threshold/ if -55mV is reached</td></tr><tr><td>4. (Neurotransmitter)</td><td>Acetylcholine/Ach/neurotransmitter is secreted/released/transmits impulse</td></tr><tr><td>5. (Synapse)</td><td>Acetylcholine/Ach/neurotransmitter/Impulse crosses synaptic cleft/synapse/gap/neuromuscular junction to muscle fibres/motor end plate</td></tr><tr><td>6. (All or none law)</td><td>This occurs in an all or none fashion/ all or none law applies Or all of the muscle fibres (within the motor unit) contract or none of them do</td></tr></table></td><td>4
(AO1)</td><td>Accept:
An impulse travels down the axon if the threshold is reached – points 1 and 3.</td></tr>
</table>

(b) Six marks from

1. (Before)	Prior to/before the run, HR (slightly) increases above rest/**anticipatory** rise
2. (During - Start)	HR **rises steeply** at the start of exercise/ HR rises in line with exercise intensity
3. (During - Plateau)	HR **plateaus** during the run/ at submaximal exercise/when performer reaches steady state exercise
4. (Intensity change)	If running speed/pace/incline changes, then heart rate will change/increase/decrease
5. (Recovery 1)	**Steep decline** in HR at the start of recovery/during alactacid recovery
6. (Recovery 2)	**Gradual decline** in HR towards resting values/lactacid recovery
7. (Elevated)	HR **remains** (slightly) **elevated** above resting levels (for up to an hour) after the training run
8. (Cool down)	If the runner completed a cool-down/active recovery, HR will remain higher (than if no cool down completed)
If graph drawn – see guidance	

6 (AO2)

Accept:

Appropriately labelled graphs

(c)

Six marks from:

Activity	Justification	Example
A	1. Low/moderate/submaximal intensity	2. e.g. Marathon/triathlon/1500m swim
B	3. Explosive/very high/high intensity	4. e.g. 60 - 400m sprint/long jump/sprint down the wing in hockey/counter attack in football/tennis rally/gymnastics routine
C	5. High/moderate intensity	6. e.g. 800m/200m swim/1-2-1 marking in football

6
(3x AO2, 3 x AO3)

Accept:
Correct sporting examples anywhere in the answer for each activity.

Do not accept:
Justification alone without correct sporting example

Do not accept:
Whole games alone, e.g. a football match or playing positions alone, e.g. a centre in netball

Note:

Different sporting examples must be used for A, B and C. Credit first use only.

<table>
<tr>
<td></td>
<td>(d)</td>
<td></td>
<td>Four marks from:
<table>
<tr><td>1. (Drying of airways)</td><td>Drying of airways/increased mucus production/ constricted airways/ decreased gaseous exchange (due to dehydration)</td></tr>
<tr><td>2. (Frequency)</td><td>Increased breathing frequency due to need to maintain oxygen consumption/oxygen delivery/ increases oxygen cost of exercise</td></tr>
<tr><td>3. (Irritation)</td><td>Airway irritation/coughing/wheezing/ asthma due to increased pollutants/allergens/higher ozone levels</td></tr>
<tr><td>4. (Performance aerobic)</td><td>Reduced aerobic performance/anaerobic energy production used at lower intensity
Or Early fatigue/reduced duration of exercise/longer recovery time in aerobic/prolonged activities</td></tr>
<tr><td>5. (Performance anaerobic)</td><td>Performance in anaerobic/explosive/max strength/power activities is unaffected</td></tr>
<tr><td>6. (Heat stress)</td><td>Heat stress/heat cramps/heat exhaustion/heatstroke/hyperthermia/heat syncope/thermal strain (causing performance to be impeded/stopped)</td></tr>
</table>
</td>
<td>4
(AO1)</td>
<td>Do not accept:
‘reduced performance’ – TV</td>
</tr>
</table>

7 (a)

Five marks from:
Must have both parts of comparison for mark

	Blood doping	IHT
1. (Legality)	Illegal	Legal
2. (Description of use)	Blood removed, athlete naturally replaces lost blood (4 weeks), blood re-infused Or compatible blood infused into the body.	Work intervals in hypoxic conditions/low PPO_2
3. (Used by)	Endurance/aerobic athletes/altitude performance or suitable eg	Endurance/aerobic athletes/altitude performers/games players or suitable eg
4. (Physiological effects)	Increased RBC/ blood volume/haemoglobin /increased oxygen carrying capacity of blood	Increased mitochondria/RBC/ blood volume/haemoglobin/ increased oxygen carrying capacity of blood/ **Or** acclimatisation for altitude
5. (Performance benefits)	Increased aerobic capacity/ increased VO2max/increased intensity and/or duration before fatigue/delayed OBLA	Increased aerobic capacity/increased intensity and/or duration before fatigue **Or** Increased mitochondria/buffering capacity so delayed OBLA
6.(Potential risks)	Increased blood viscosity/decreased Q/ increased risk of blood clots/heart failure /transfusion infections	Decreased immune function/increased risk of infection/dehydration/loss of training quality/benefits quickly lost when IHT stops

5 (AO3)

Stamp first point with a KU and comparative point with a TICK (1 mark for each valid comparison)

Accept: Reference to 'both' for similarities in pts 3,4,5. eg. **Both** are used by endurance athletes = pt.3.

Accept: Comparative language for points 1 and 6, eg: Blood doping is illegal whereas IHT isn't

or eg: Blood doping increases the risk of transfusion infections whereas IHT doesn't.

<table>
<tr>
<td></td><td>(b)</td><td>(i)</td>
<td>Two marks from:
<table>
<tr><td>1. (Definition)</td><td>The ability to use/utilise oxygen to perform sustained/prolonged/submaximal activity.</td></tr>
<tr><td>2. (Example)</td><td>Long distance running/rowing/cycling/swimming, or hockey/rugby/football</td></tr>
</table>
</td>
<td>2
(AO1)</td>
<td>Accept:
pt.2 any endurance activity or sport including team games.</td>
</tr>
<tr>
<td></td><td></td><td>(ii)</td>
<td>Four marks from:
<table>
<tr><td>1.(Respiratory muscles)</td><td>Stronger respiratory muscles = greater VO^2 max/inspire larger volumes of air</td></tr>
<tr><td>2.(Respiratory volume)</td><td>Larger lung size/volume/increased number of alveoli = greater VO^2 max/inspire larger volumes of air/greater gaseous exchange</td></tr>
<tr><td>3.(Heart size)</td><td>Larger heart/stronger heart/cardiac hypertrophy/larger (left) ventricle/greater contractility = greater VO^2 max/ greater transportation rate of oxygenated blood flow</td></tr>
<tr><td>4.(Capillarisation)</td><td>More capillaries/capillarisation at lung/muscle = greater VO^2 max/increased surface area for gaseous exchange</td></tr>
<tr><td>5. (Blood volume/Hb)</td><td>Greater blood volume/red blood cell count/haematocrit/haemoglobin = greater VO^2 max/increased oxygenated blood flow</td></tr>
<tr><td>6. (Elasticity)</td><td>Greater elasticity of blood vessels/lung tissue/cardiac tissue = greater VO^2 max</td></tr>
<tr><td>7. (Slow oxidative muscle fibres)</td><td>Greater number/proportion of slow oxidative/type 1 muscle fibres = greater VO^2 max/increased aerobic energy production</td></tr>
<tr><td>8. (Mitochondria)</td><td>Greater number/size of mitochondria (in muscle cells) = greater VO^2 max/increased aerobic energy production</td></tr>
<tr><td>9. (Myoglobin)</td><td>Greater myoglobin content = greater VO^2 max/increased aerobic energy production</td></tr>
</table>
</td>
<td>4
(AO1)</td>
<td>Accept:
Opposites throughout
pt.1 any example of a respiratory muscle
Accept:
Lists of physiological features which end with = VO2max.</td>
</tr>
</table>

<table>
<tr>
<td></td><td>(c)</td><td>(i)</td>
<td>Two marks for:
<table>
<tr><td>1. (Type of flexibility)</td><td><u>Dynamic</u></td></tr>
<tr><td>2. (Explanation)</td><td>hurdler needs range of motion at joint whilst moving at speed
or
appropriate eg: to lift lead leg over the hurdle at speed
or
explosive strength is needed</td></tr>
</table>
</td>
<td>2
(AO2)</td>
<td>Accept: explanation without correct identification of dynamic flexibility (do not carry error forward)

Accept: RoM for range of motion

Accept: ‘range of movement’ for range of motion - BOD</td>
</tr>
<tr>
<td></td><td></td><td>(ii)</td>
<td>Three marks for:

1 mark
<table>
<tr><td>(Adaptation)</td><td>1. Increased resting length muscle/connective tissue
Or Increased elasticity of muscle/connective tissue</td></tr>
</table>
1 mark
<table>
<tr><td>(Effect)</td><td>2. Inhibited/desensitized/reduced stretch reflex/muscle spindles adapt to new length/decreased inhibition from antagonist
Or Increased force of contraction
Or Increased range of motion</td></tr>
</table>
1 mark
<table>
<tr><td>(Performance)</td><td>3. Decreased risk of injury for the hurdler
Or Increased efficiency/technique/power/speed of the hurdler
Or relevant applied example, eg: lifting their lead leg higher to clear the hurdle</td></tr>
</table>
</td>
<td>3
(AO2)</td>
<td></td>
</tr>
</table>

(d) Four marks from:

Intrinsic RF	Management of factor to prevent injury
1. (Individual variables - general)	Devise an individualised training plan
2. (Training effects-general)	Ensure adequate preparation/recovery **by** warming up/adequate sleep/appropriate rest Or Follow a planned/progressive training schedule **to** prepare effectively for competition/ensure training adaptations are specific to the individual/sport
3. (Injury)	Ensure that (previous) injury has been treated/ rehabilitated fully (before returning to sport)
4. (Posture and alignment/core stability)	Follow appropriate training/physiotherapy **to** promote good posture (and alignment)/muscle balance Or avoid/limit activities/movements **that** put undue stress on a weak area of the body (e.g. care taken with an athlete with scoliosis or with a difference in leg length)
5. (Age)	Be more mindful with older performers **by** using age appropriate categories/activities eg: walking football Or Aging increases the chance of injuries, **so** manage this by maintaining fitness/a healthy lifestyle
6. (Nutrition)	**Ensure** a healthy balanced diet is followed/sufficient protein/calcium/hydration or equivalent.
7. (Fitness/ Flexibility/ Strength)	**Ensure** the correct level of fitness/flexibility/strength/fitness components required are at the right level

4 (AO3)

<table>
<tr><td>8</td><td>(a)</td><td>(i)</td><td>One mark for:
B 980N</td><td>1
(AO2)</td><td>Note: If more than one box ticked accept first answer only</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>One mark for:
<table><tr><td>1. (Downwards force <u>and</u> reaction force)</td><td>Performer applies <u>downwards</u> force/muscle contraction/pushes <u>downwards</u> into the ground
<u>And</u>
The ground applies (equal) opposite/<u>upwards</u> force on the performer</td></tr></table></td><td>1
(AO2)</td><td></td></tr>
<tr><td></td><td></td><td>(iii)</td><td>Three marks for:

1 mark:<table><tr><td>1.(Measure)</td><td>Measure/assess take-off forces/landing forces/applied forces/power/acceleration/impulse/balance</td></tr></table>
1 mark:<table><tr><td>2.(Use data)</td><td>(Analyse data to) track/monitor performance
Or Optimise angle of take-off
Or Compare the force from the left to right side/bilateral imbalances</td></tr></table>
1 mark:<table><tr><td>3.(Performance)</td><td>Maximise acceleration/impulse
Or Improve posture/alignment
Or Improve technique/timing
Or Make recommendations prevent injury
Or Adapt/design prostheses for a para-athlete
Or Inform training programmes</td></tr></table></td><td>3
(AO2)</td><td></td></tr>
</table>

<table>
<tr>
<td></td>
<td>(b)</td>
<td></td>
<td>Six marks from:
<table>
<tr><td>1. (Identification A)</td><td>Angular momentum</td></tr>
<tr><td>2. (Constant AM)</td><td>angular momentum is conserved/stays constant/ the same during flight
Or line A remains constant throughout the somersault due to the law of conservation of angular momentum /the angular analogue of Newton’s first law</td></tr>
<tr><td>3. (Identification B)</td><td>Moment of inertia</td></tr>
<tr><td>4. (High-low high MI)</td><td>Moment of inertia is greater when mass distributed further from the axis of rotation/ body extended/stretched out.
Or
Line B is higher/greater/larger at start and finish of dive where body is extended/stretched out/distributed a long way from the (transverse) axis</td></tr>
<tr><td>5. (Identification C)</td><td>Angular velocity</td></tr>
<tr><td>6. (Low-high-low AV)</td><td>Angular velocity increases when moment of inertia decreases (in order to keep angular momentum constant)/mass is distributed close to the axis of rotation/MI and AV are inversely related.
Or
Line C is higher/greater/larger in the middle of the dive where the body is piked/folded in/mass distributed closer to the axis of rotation</td></tr>
</table>
</td>
<td></td>
<td>6
(AO2)</td>
<td>Accept

opposites for pts 4 and 6

Do not accept: centre of mass (as an alternative for axis of rotation)</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>(c)</td>
<td></td>
<td>Four marks from:
<table>
<tr><td>1. Height
of release</td><td>The higher the release height, the greater the distance travelled</td></tr>
<tr><td>2. Speed
of release</td><td>The faster the speed of release, the greater the distance travelled</td></tr>
<tr><td>3. (Angle: release = landing height)</td><td>(The optimal) angle of release is 45^o if the release and landing heights are the same</td></tr>
<tr><td>4. (Angle: release > landing height)</td><td>(The optimal) angle of release is less than 45^o if the height of release is higher than the landing height</td></tr>
<tr><td>5. (Angle: release < landing height)</td><td>(The optimal) angle of release is more than 45^o if the height of release is lower than the landing height</td></tr>
</table></td>
<td>4
(AO1)</td>
<td>Accept:
pt.1 and 2 accept opposites.</td>
</tr>
<tr>
<td></td>
<td>(d)</td>
<td></td>
<td>Five marks from:
<table>
<tr><td>1. (Principle)</td><td>(Bernoulli’s principle is based on) Fast flow and pressure low</td></tr>
<tr><td>2. (Aerofoil/angle of attack)</td><td>Aerofoil shape/one surface more curved than the other
Or
Angle of attack required (for a symmetrical aerofoil)</td></tr>
<tr><td>3. (Speed of fluid)</td><td>Fluid travels faster/higher velocity over one surface/longer of the aerofoil/object/body</td></tr>
<tr><td>4. (Pressure differential/gradient)</td><td>Pressure on one side of the aerofoil/object/body is greater than the other side
Or there is a pressure differential/gradient/difference</td></tr>
<tr><td>5. (Lift force)</td><td>A lift force created from high to low pressure/towards the area of lower pressure</td></tr>
<tr><td>6. (Effect upwards)</td><td>Upwards lift force extends flight/time in air</td></tr>
<tr><td>7. (Effect downwards)</td><td>Downwards lift force/Downforce pushes the object/body into the ground/increases friction force/grip</td></tr>
</table></td>
<td>5
(AO1)</td>
<td>Accept:
Air or water as an example of a fluid throughout</td>
</tr>
</table>

Section C		
Q	**Answer**	**Guidance**
9*	**Level 4 (17–20 marks)** • detailed knowledge and excellent understanding (AO1) • well-argued judgements which are well supported by relevant practical examples (AO2) • detailed analysis and critical evaluation (AO3) • very accurate use of technical and specialist vocabulary • there is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.	**At Level 4 responses <u>are likely</u> to include:** • Detailed movement analysis in shoulder, elbow **and** wrist joint covered with accuracy and explanation (KU). • Role of fixators covered accurately Excellent explanation of both SALTAPS and PRICE supported by appropriate applied examples of upper body sporting injury(s) • Detailed evaluation of both the injury response protocols
	Level 3 (12–16 marks) • good knowledge and clear understanding (AO1) • judgements will be present but may not always be supported by relevant practical examples (AO2) • good analysis and critical evaluation (AO3) • generally accurate use of technical and specialist vocabulary • there is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.	**At Level 3 responses <u>are likely</u> to include:** • Good movement analysis in shoulder, elbow and wrist joint covered but accuracy lacking in some areas. • May have reference to role of fixators • Good knowledge of both SALTAPS and PRICE with links to an applied example of upper body sports injuries • Some evaluation of the injury response protocols
	Level 2 (7-11 marks) • limited knowledge and understanding (AO1) • judgement given but often unsupported by relevant practical examples (AO2) • some evidence of analysis and critical evaluation (AO3) • technical and specialist vocabulary used with limited success • the information has some relevance and is presented with limited structure. The information is supported by limited evidence.	**At Level 2 responses <u>are likely</u> to include:** • Limited movement analysis in shoulder, elbow and wrist joint in preparation or execution phase but with inaccuracies • SALTAPS and PRICE described with limited application to an appropriate sporting example(s)

Section C		
Q	**Answer**	**Guidance**
	Level 1 (1–6 marks) • basic knowledge and little understanding (AO1) • little or no attempt to give judgement (AO2) • little relevant analysis or critical evaluation (AO3) • little or no attempt to use technical and specialist vocabulary • 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.	**At Level 1 responses <u>are likely</u> to include:** • Basic movement analysis with inaccuracies • Some parts of the injury response protocols may have been named but with little explanation or link to injuries.
	(0 marks) No response or no response worthy of credit.	

Marks: 20 (AO1 x6, AO2 x7, AO3 x7)	**Guidance:** Maximum of 6 marks to be awarded for AO1 Maximum of 7 marks to be awarded for AO2 Maximum of 7 marks to be awarded for AO3
<u>Indicative Content:</u>	

<table>
<tr><th colspan="4">AO1 (KU)</th></tr>
<tr><th>Movement</th><th>Agonist</th><th>Antagonist</th><th>Role of fixator</th></tr>
<tr><td>1. Flexion is decreased angle at the joint/ between body parts
2. Extension is increased angle at the joint/ between body parts</td><td>3. Agonist muscle causes the movement/prime mover
4. Insertion moves towards the origin
5. (Isotonic) concentric contraction/shorten under tension</td><td>6. Antagonist muscle works in opposition to the agonist
8. Antagonist coordinates the movement
9. (Isotonic) eccentric contraction if lengthening under tension/controlling the movement
10. (muscles work in) Antagonistic pair</td><td>11. Stabilises one part of the body during the movement of another
12. Isometric/static contraction
13. Stabilises the origin of the agonist
14. Increases efficiency of the movement/action of the agonist
15. Prevents undesired movements</td></tr>
<tr><td colspan="4">AO2 (EG of 1-10) Accept any relevant example linked to an AO1 (KU) point

EG (of 11-15) Accept examples of named fixator muscles (any muscle located at the agonist’s origin) Eg: Shoulder - teres minor/ Elbow – deltoid/ Wrist – Brachioradialis</td></tr>
<tr><td colspan="4">AO3 (DEV): Preparation Phase. Note: Only credit shoulder agonist/antagonist once</td></tr>
<tr><td></td><td>Movement (DEV 1/2)</td><td>Agonist (DEV of 3-5)</td><td>Antagonist (DEV of 6-10)</td></tr>
<tr><td>• Shoulder</td><td>Flexion</td><td>Anterior Deltoid or pectolaris major</td><td>Posterior Deltoid or latissimus dorsi</td></tr>
<tr><td>• Elbow</td><td>Flexion</td><td>Biceps brachii</td><td>Triceps brachii</td></tr>
<tr><td>• Wrist</td><td>Extension</td><td>Wrist extensors</td><td>Wrist flexors</td></tr>
<tr><td colspan="4">AO3 (DEV): Execution Phase</td></tr>
<tr><td>• Shoulder</td><td>Flexion</td><td>Anterior deltoid or pectolaris major</td><td>Posterior Deltoid or latissimus dorsi</td></tr>
<tr><td>• Elbow</td><td>Extension</td><td>Triceps brachii</td><td>Biceps brachii</td></tr>
<tr><td>• Wrist</td><td>Flexion</td><td>Wrist flexors</td><td>Wrist extensors</td></tr>
</table>

AO1 (KU)	AO2 (EG)	AO3 (DEV)
16. **SALTAPS** used to assess acute injuries	• Sprain/strain/abrasion/concussion/haematoma/fracture/dislocation/ cartilage damage • Appropriate eg: sprained wrist in netball/ blow to the head in skiing etc.	(+ve) • An effective structure to assess for possible injury • Can be done pitch-side • Players can return to play if all aspects of SALTAPS are 'passed' • Responder can stop SALTAPS at any time to refer the player to hospital/medical help • Easy for coaches to learn/remember • Prevents further damage occurring (-ve) • Responder may not ask the right questions/spot deformity etc so injury may be missed • Player may not answer accurately/truthfully/mask pain if they want to stay on the pitch • Player may be cleared to return to play with an injury • 6Rs in rugby may be more appropriate for concussion assessment • Not appropriately qualified personnel • Could make injury worse (20-22)
17. (See Or Stop) See the injury or stop the game	• See the player fall • Stop the game to observe the injury	
18.(Ask) Ask the player where/how severe the pain is	• Is it a sharp or a dull ache? • Did you hear anything when it happened?	
19. (Look) Look for any swelling/deformity/bruising/ bleeding	• May indicate dislocation/fracture • Compare right and left sides	
20. (Touch) touch the injured part gently	• Starting away from the injury site then moving towards it • Checking player for signs of pain	
21. (Active) Active movement by the player	• Ask the player to move (upper body area) through its range of motion • Stop when painful • Compare range of movement with the opposite upper body area	
22. (Passive) Passive movement by responder	• Responder moves upper body area though range of motion without resistance from the player (stop when pain felt) • Avoids activation of muscles around the upper body area • Compare range of movement to opposite upper body area	
23. (Strength) Strength of injured area	• Can the player put pressure / weight on their injured upper body area? • Player resists movement to their upper body area made by the therapist to check strength. • Assess for strength in mid-range of movement • Use isometric muscle strength testing	

AO1 (KU)	AO2 (EG)	AO3 (DEV)
24. **PRICE** used to treat acute soft tissue injuries	• Use for 2 -3 days following injury	(+ve) • Speeds up recovery • Other treatments can be used in addition, such as pain-relief medicines/massage • Easily accessible (-ve) • Some injuries may need urgent further medical treatment eg: shoulder dislocation so PRICE not sufficient on it's own • Risk of ice burns if ice applied directly to skin/ avoid icing chest if performer has angina • Compression may be too tight and limit blood flow • Raising upper body part above heart may cause more pain/worsen injury • Not appropriate for all injuries, eg: compound fracture
25. (Protect) Protect from further injury	• Use of sling/splint • And remove from pitch/court	
26. (Rest) Rest until healed	• Although some gentle pain free movement can speed up recovery	
27. (Ice) Ice area/to skin (indirectly) to reduce swelling/pain	• Ice wraps/packs/game ready system • Limit to cycles of 10-15 mins every 1-2 hours	
28.(Compress) Compression to reduce swelling	• Tape, apply stretch bandage to upper body area	
29. (Elevate) Elevation of injured part	• Use sling to raise upper body area • Remain upright if upper body area injured • To reduce blood flow to the area/fluid pooling/control swelling/decrease pain	

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on

01223 553998

Alternatively, you can email us on

support@ocr.org.uk

For more information visit

ocr.org.uk/qualifications/resource-finder

ocr.org.uk

Twitter/ocrexams

/ocrexams

/company/ocr

/ocrexams

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT

OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up-to-date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please contact us.

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our Expression of Interest form.

Please get in touch if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.