GCSE
PHYSICAL EDUCATION
PAPER 1

THE HUMAN BODY AND MOVEMENT IN PHYSICAL ACTIVITY AND SPORT

Mark scheme

Draft Specimen material

v0.1

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

01 Which **one** of these is an immediate effect of exercise?

[1 mark]

Marks for this question: AO1 = 1

D

02 Which **one** of these performers relies most heavily on their cardiovascular endurance?

[1 mark]

Marks for this question: AO2 = 1

B

03 Which **one** of these shows how to calculate the mechanical advantage of a lever?

[1 mark]

Marks for this question: AO1 = 1

B

04 Which **one** of these describes flexibility?

[1 mark]

Marks for this question: AO1 = 1

C

05 Which **one** of these operates around the transverse axis and along the sagittal plane?

[1 mark]

Marks for this question: AO2 = 1

C

06 Which **one** of these causes flexion of the arm at the elbow?

[1 mark]

Marks for this question: AO1 = 1

A

07 Which bones are found at the shoulder joint?

[1 mark]

Marks for this question: AO1 = 1

C

08 Which bones are found at the elbow joint?

[1 mark]

Marks for this question: AO1 = 1

A

09.1 Identify the type of synovial joint working at the shoulder.

[1 mark]

Marks for this question: AO1 = 1

Award **one** mark for each of the following points up to a maximum of one mark.

- Ball and socket (1)

Maximum 1 mark

09.2 Explain **two** of the features of the shoulder joint that aim to prevent injury occurring.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Shape of the articular surface / bones – allows bones to fit together (1)
- Ligaments – attach bone to bone / restrict movement (1)
- Joint capsule / fibrous capsule – lined with synovial membrane / encloses / supports / joints (1)
- Synovial membrane – secrets synovial fluid (1)
- Synovial fluid – provides lubrication (1)
- Cartilage (hyaline / articular) – prevents fiction / stops bone rubbing together (1)
- Bursae (sacks of fluid) – to reduce friction (1)

Maximum 2 marks

10 Identify the **two** types of movement that can occur at a hinge joint.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Flexion (1)
- Extension (1)

Maximum 2 marks

11 **Figure 1** shows a diagram of the heart.

Using **Figure 1**, identify the names of the chambers of the heart labelled **X** and **Y**.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

X. (Left) atrium (1)
Y. (Left) ventricle (1)

Maximum 2 marks

12 Define cardiac output.

[1 mark]

Marks for this question: AO1 = 1

Award **one** mark for either of the following points up to a maximum of one mark.

- The amount of blood ejected / pumped from the heart in one minute (1)
- Stroke volume x heart rate (1)

Maximum 1 mark

13.1 For an elite athlete, is the 100m sprint an aerobic or anaerobic event? Explain your answer.

[3 marks]

Marks for this question: AO2 = 1, AO3 = 2

Award **one** mark for each of the following points up to a maximum of three marks.

AO2
- Anaerobic (1)

AO3 (sub-max 2 marks)
- Sprint lasts for 10 seconds/equivalent (1)
- Maximal intensity / effort (1)
- Insufficient time to have enough oxygen available (1)
- Body needs to use anaerobic exercise summarised as glucose → energy + lactic acid (1)

Maximum 3 marks

13.2 Explain how an athlete could calculate his/her aerobic training zone.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Maximum heart rate (220 bpm) minus age / 220 - age (1)
- Work at 60-80% of maximum heart rate (1)

Maximum 2 marks

14 Explain why continuous training might not be appropriate for a games player.

[2 marks]

Marks for this question: AO3 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Not always specific to the game (1)
- Games require aerobic and anaerobic energy (1)
- Games stop and start – different to continuous (1)
- Not specific to the skills needed in a game (ie it is just running or swimming) (1)
- Wouldn't apply to a goalkeeper / wicketkeeper (1)

Accept any other suitable justification as to why continuous training might not be appropriate for a games player.

Maximum 2 marks

15 **Figure 2** shows a person kicking a football.

Complete **Table 1** to show the joint action occurring at the knee from position **A** to position **B and** the agonist muscle group that causes this action.

[2 marks]

Marks for this question: AO2 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

Joint action	Agonist muscle group
Extension (1)	Quadriceps (1)

Maximum 2 marks

16.1 The respiratory system undergoes a number of changes during exercise.

Define the terms tidal volume and residual volume.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Tidal volume – volume of air inspired or expired / exchanged per breath (1)
- Residual volume – volume of air left in the lungs after maximal expiration (1)

Maximum 2 marks

16.2 Outline what happens to tidal volume **and** stroke volume once exercise starts.

[2 marks]

Marks for this question: AO2 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Tidal volume – Increases (once exercise starts) (1)
- Residual volume – Stays the same (once exercise starts) (1)

Maximum 2 marks

17.1 **Figure 3** shows a basketball player jumping to execute a shot.

Identify the lever system which operates at the ankle joint.

[1 mark]

Marks for this question: AO2 = 1

Award **one** mark for each of the following points up to a maximum of one mark.

- Second (class lever system) (1)

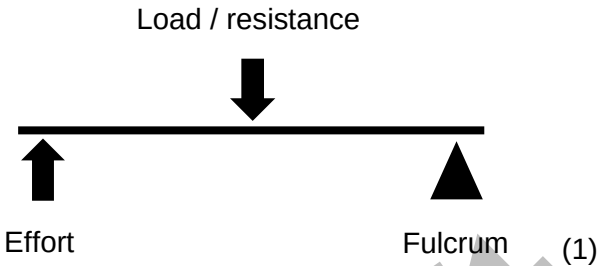
Maximum 1 mark

17.2 Complete **Figure 4** by drawing the lever system identified in **17.1**, labelling the fulcrum, effort and load (resistance).

[1 mark]

Marks for this question: AO1 = 1

Award **one** mark for labelling the effort, load / resistance and fulcrum in the correct order.



(1)

Maximum 1 mark

18 Training in sport is often structured into seasons.

State **two** aims of pre-season training.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Increase aerobic fitness or general fitness (1)
- Increase specific fitness, eg weight training for strength (1)
- Develop techniques and skills specific to the sport (1)

Accept any other suitable aim of pre-season training. Answers must refer to general / specific fitness or technique and skills.

Maximum 2 marks

19 State **two** reasons why fitness testing is carried out.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- To identify strengths and / or weaknesses in a performance (1)
- To evaluate the success of a training programme (1)
- To monitor improvement, eg in strength (1)
- To show a starting level of fitness (1)
- To inform training requirements (1)
- To compare against norms of the group / national averages (1)
- To be used as a motivational tool (1)

Accept any other suitable reason why fitness testing is carried out.

Maximum 2 marks

20 Identify a suitable test to measure flexibility. Describe how to carry out this test.

[3 marks]

Marks for this question: AO1 = 2 and AO2 = 1

Award **one** mark for each of the following points up to a maximum of three marks.

AO2
- Sit and reach test (1)

AO1 (sub-max 2 marks)
- Shoes off (1)
- Sit on floor (legs flat) (1)
- Feet flat against board (1)
- Reach past zero on the board as far as possible (it is a maximal test) (1)
- Record score past zero (1)
- Compare to national average (1)

Maximum 3 marks

21 Explain how the principles of overload could be used to help a beginner to improve his/her fitness.

[4 marks]

Marks for this question: AO2 = 4

Award **one** mark for each of the following points up to a maximum of four marks.

- Frequency – gradually train more often (1)
- Intensity – gradually increase the intensity (1)
- Time – gradually train for longer (1)
- Type – choose an appropriate training session / programme (1)

Maximum 4 marks

22.1 Describe the mechanics of inhalation at rest.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Diaphragm pulls down / contracts / flattens (1)
- Intercostal muscles contract (1)
- Air pressure is reduced (1)
- Air is sucked (through the tubes) into the lungs (1)
- Chest expands (1)

Maximum 2 marks

22.2 Describe how the mechanics of breathing change during exercise.

[2 marks]

Marks for this question: AO2 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Lungs can expand more while inhaling during exercise (1)
- Due to the use of other muscles / sternocleidomastoid / pectorals (1)
- The rib cage is pulled down quicker while exhaling to force air out quicker (1)
- Due to use of the abdominal muscles (1)

Maximum 2 marks

23 Gaseous exchange occurs at the alveoli.

Identify **two** features that assist in gaseous exchange at the alveoli.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Large surface area of alveoli (1)
- Moist thin walls (one cell thick) (1)
- Short distance for diffusion (short diffusion pathway) (1)
- Lots of capillaries (1)
- Large blood supply (1)
- Movement of gas from high concentration to low concentration (1)

Maximum 2 marks

24.1 Explain what should be considered at the start of a hockey training session to reduce the chance of injury occurring.

[2 marks]

Marks for this question: AO2 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

The answer must be applied to hockey.

- Stretches should not be over-stretched or bounce, eg use of static stretches prior to hockey training (1)
- Plan to avoid over-training, eg plan to do a hockey training session that is not too long / does not cause injury / provides appropriate rest (1)
- Appropriate clothing and footwear should be worn, eg astro turf trainers (1)
- Taping / bracing can be used as necessary, eg to protect ankles (1)
- Hydration should be maintained, eg breaks in the hockey training for water (1)

Accept any other suitable explanation of what should be considered at the start of a hockey training session to reduce the chance of injury occurring. Explanation must be linked to hockey.

Maximum 2 marks

24.2 Identify **two** parts of an effective cool down.

[2 marks]

Marks for this question: AO1 = 2

Award **one** mark for each of the following points up to a maximum of two marks.

- Maintain elevated breathing and heart rate, eg walk, jog (1)
- Gradual reduction in intensity of exercise (1)
- Stretching (1)

Maximum 2 marks

25 Movement is brought about by the muscular and skeletal systems working together.

Using an example, explain how muscles and bones work together to produce movement.

[4 marks]

Marks for this question: AO2 = 4

Award **one** mark for each of the following points up to a maximum of four marks.

The answer must be applied to an example, eg upwards phase of a bicep curl

- Muscles are attached to bones via tendons (1)
- Muscles can only pull (1)
- Are arranged in (antagonistic) pairs, eg bicep and tricep (1)
- One / the agonist / the prime mover contracts / shortens, eg bicep (1)
- One / the antagonist relaxes / lengthens, eg tricep (1)
- Ligaments keep the joint stable during movement (1)
- Movement can only occur at a joint (1)

Maximum 4 marks

26 The vertical jump test measures leg power.

Discuss whether or not this is a suitable test for a football player.

[3 marks]

Marks for this question: AO3 = 3

Award **one** mark for each of the following points up to a maximum of three marks.

- Leg power is needed by football players (1)
- The test measures the ability to jump up so appropriate for jumping to head the ball / a goalkeeper to launch into a save (1)
- Would not test power needed to kick a ball / start a sprint towards the ball (1)
- Does not test many aspects of playing football (1)
- There are other more important aspects of fitness, eg cardiovascular endurance (1)
- Footballers tend to jump from a moving start not a standing start – not sport specific (1)

Maximum 3 marks

27.1 **Table 2** shows the heart rates recorded by an athlete when running at different speeds.

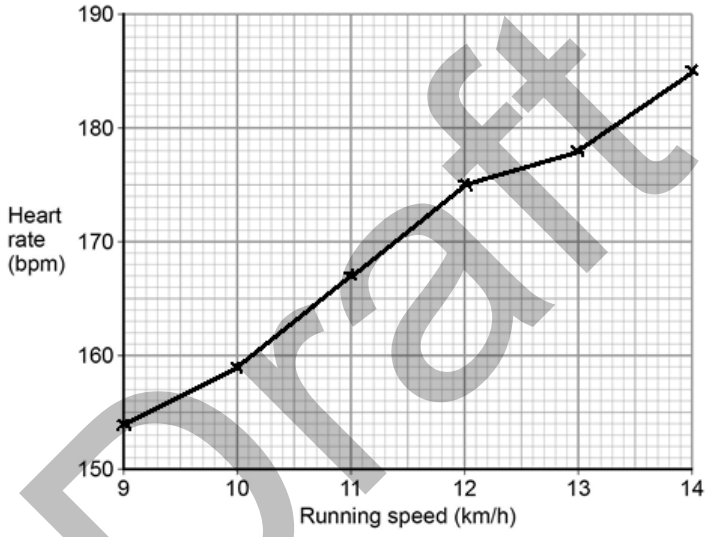
Plot the information shown in **Table 2** on the graph paper below to show how running speed affects heart rate. Label the axes and join up the points to make a line graph.

[4 marks]

Marks for this question: AO3 = 4

Award **one** mark for each of the following points up to a maximum of four marks.

- Correctly labelled x axis (running speed km/h) and correctly labelled y axis (heart rate bpm) (1)
- Appropriate numbering on each axes (1)
- Points plotted correctly (1)
- Line plotted correctly (1)



Maximum 4 marks

27.2 Explain why high altitude training is appropriate for a marathon runner.

[3 marks]

Marks for this question: AO3 = 3

Award **one** mark for each of the following points up to a maximum of three marks.

- It requires aerobic fitness (1)
- Performance relies on sufficient oxygen supplied to working muscles (1)
- However, there is a lack of O_2 at altitude (1)
- Body compensates over time by making more red blood cells (1)
- To carry more oxygen (1)

Accept any other explanation as to why high altitude training is appropriate for a marathon runner.

Maximum 3 marks

28 Discuss whether or not agility and reaction time are important components of fitness for performers in the 100m sprint.

[6 marks]

Marks for this question: AO1 = 1, AO2 = 2 and AO3 = 3

Level	Marks	Description
3	5–6	Knowledge of agility and reaction time is accurate and generally well detailed. Application to performers in the 100m sprint is mostly clear and effective. Discussion is apparent and effective. The answer is generally coherent with appropriate use of terminology.
2	3–4	Knowledge of agility and reaction time is evident. There is some effective application to performers in the 100m sprint. Any discussion is only partly effective. The answer lacks clarity in places. Terminology is used appropriately on occasions.
1	1–2	Knowledge of agility and reaction time is limited. Application to performers in the 100m sprint is either absent or inappropriate. Discussion is limited, poorly focused or absent. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
	0	No relevant content.

Possible content may include:

AO1 – Knowledge
Knowledge of agility and reaction time, eg
- Agility – changing direction at speed, whilst maintaining control
- Reaction time – time taken to initiate response to a stimulus

AO2 – Application to the 100m, eg
- 100m sprint does not need agility – no changing of direction required for 100m sprint
- 100m does need reaction time – reacting to the gun at the start (stimulus)

AO3 – Analysis/evaluation of the importance of agility and reaction time in 100m, eg
- 100m short event
- Start and reaction is crucial to success
- Reaction has a bearing on overall time taken to complete the 100m sprint

Credit other suitable responses relevant to the question.

29	With reference to a named sporting activity of your choice, outline the component parts of a warm up, explaining the benefits of completing each part. **[6 marks]**

Marks for this question: AO1 = 1, AO2 = 2 and AO3 = 3

Level	Marks	Description
3	5–6	Knowledge of the component parts of a warm up is accurate and generally well detailed. Application to a named sporting activity is mostly clear and effective. Explanation of the benefits of completing each part is apparent and effective. The answer is generally coherent with appropriate use of terminology.
2	3–4	Knowledge of the component parts of a warm up is evident. There is some effective application of the benefits of completing each part to a named sporting activity. Any explanation of the benefits of completing each part is only partly effective. The answer lacks clarity in places. Terminology is used appropriately on occasions.
1	1–2	Knowledge of the component parts of a warm up is limited. Application of the benefits of completing each part to a named sporting activity is either absent or inappropriate. Explanation of the benefits of completing each part is limited, poorly focused or absent. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
	0	No relevant content.

Possible content may include:

AO1 – Knowledge of the component parts of a warm up, eg
- (Stage 1) – gradual pulse raising activity
- (Stage 2) – stretching
- (Stage 3) – skill based practices / familiarisation

AO2 – Application to a named sporting activity, eg
- Eg Badminton
- (Stage 1) – light jog around the sports hall
- (Stage 2) – static held, suitable muscle groups to the sport, eg hamstring, quadriceps, deltoids
- (Stage 3) – Practices linked, eg non-competitive rally

AO3 – Analysis/evaluation of the benefits of completing each part, eg
- Mental preparation for the badminton match
- Appropriate application of mental preparedness for the sporting activity, eg visualising shot selection / arousal control prior to game
- Reduces risk of injury

Credit other suitable responses relevant to the question.

Component 1 – The human body and movement in physical activity and sport

Assessment objectives grid

Question	AO1	AO2	AO3	Total
01	1			1
02		1		1
03	1			1
04	1			1
05		1		1
06	1			1
07	1			1
08	1			1
09.1	1			1
09.2	2			2
10	2			2
11	2			2
12	1			1
13.1		1	2	3
13.2	2			2
14			2	2
15		2		2
16.1	2			2
16.2		2		2
17.1		1		1
17.2	1			1
18	2			2
19	2			2
20	2	1		3
21		4		4
22.1	2			2
22.2		2		2
23	2			2
24.1		2		2
24.2	2			2
25		4		4
26			3	3
27.1			4	4
27.2			3	3
28	1	2	3	6
29	1	2	3	6
Total	**33**	**25**	**20**	**78**

8 September 2015