



NCFE Level 1/2 Technical Award in Health and Fitness (603/2650/5)

Unit 01 Introduction to body systems and principles of training in health and fitness

Paper number: Past Paper
November 2019

Mark Scheme

This mark scheme has been written by the Assessment Writer and refined, alongside the relevant questions, by a panel of subject experts through the external assessment writing process and at standardisation meetings.

The purpose of this mark scheme is to give you:

- examples and criteria of the types of response expected from a learner
- information on how individual marks are to be awarded
- the allocated assessment objective(s) and total mark for each question.

Marking guidelines

General guidelines

You must apply the following marking guidelines to all marking undertaken throughout the marking period. This is to ensure fairness to all learners, who must receive the same treatment. You must mark the first learner in exactly the same way as you mark the last.

- The mark scheme must be referred to throughout the marking period and applied consistently. Do not change your approach to marking once you have been standardised.
- Reward learners positively giving credit for what they have shown, rather than what they might have omitted.
- Utilise the whole mark range and always award full marks when the response merits them.
- Be prepared to award zero marks if the learner's response has no relevant material.
- Do not credit irrelevant material that does not answer the question, no matter how impressive the response might be.
- The marks awarded for each response should be clearly and legibly recorded in the grid on the front of the question paper.
- If you are in any doubt about the application of the mark scheme, you must consult with your Team Leader or the Chief Examiner.

Guidelines for using extended response marking grids

Extended response marking grids have been designed to award a learner's response holistically and should follow a best-fit approach. The grids are broken down into levels, with each level having an associated descriptor indicating the performance at that level. You should determine the level before determining the mark.

When determining a level, you should use a bottom up approach. If the response meets all the descriptors in the lowest level, you should move to the next one, and so on, until the response matches the level descriptor. Remember to look at the overall quality of the response and reward learners positively, rather than focussing on small omissions. If the response covers aspects at different levels, you should use a best-fit approach at this stage, and use the available marks within the level to credit the response appropriately.

When determining a mark, your decision should be based on the quality of the response in relation to the descriptors. Standardisation materials, marked by the Chief Examiner, will help you with determining a mark. You will be able to use exemplar learner responses to compare to live responses, to decide if it is the same, better or worse.

You are reminded that the indicative content provided under the marking grid is there as a guide, and therefore you must credit any other suitable responses a learner may produce. It is not a requirement either, that learners must cover all of the indicative content to be awarded full marks.

Assessment objectives

This unit requires learners to:

A01	Recall knowledge and show understanding
A02	Apply knowledge and understanding
A03	Analyse and evaluate knowledge and understanding.

The weightings of each assessment objective can be found in the qualification specification.

Question Number	Mark scheme	Total Marks
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Section 1

Total for this section: 8 marks

1	Which type of joint is found at the base of the thumb? Answer: D (Saddle)	1 AO1=1
2	Which one of the following statements best describes the term 'adduction' at a ball and socket joint? Answer: B (The movement of a limb towards the midline of the body)	1 AO1=1
3	Which one of the following muscles is in the shoulder? Answer: A (Deltoid)	1 AO1=1
4	What is vital capacity? Answer: C (The maximum amount of air you can exhale after taking the deepest inspiration)	1 AO1=1
5	Which one of the following is a short-term effect of exercise? Answer: A (Increased body temperature)	1 AO1=1
6	What is stroke volume? Answer: C (The volume of blood that leaves the heart during each contraction)	1 AO1=1
7	Which one of the following activities would be classed as aerobic? Answer: C (Jogging for a mile)	1 AO2=1
8	Which one of the following heart chambers receives oxygenated blood from the pulmonary vein? Answer: A (Left atrium)	1 AO2=1

Section 2

Total for this section: 51 marks

9	<p>State two functions of the skeletal system.</p> <p>Award one mark for each function.</p> <ul style="list-style-type: none"> • Support (1) • Movement (1) • Protection of vital organs (1) • Storage of minerals (1) • Blood cell production (1) • Shape (1). 	<p>2</p> <p>AO1=2</p>
10	<p>Identify two different types of bone and give an example of each type.</p> <p>Award one mark for each type of bone and one mark for each correct example.</p> <ul style="list-style-type: none"> • Long (1) – humerus (1), femur (1) • Flat (1) – ribs (1), sternum (1), scapula (1) • Irregular (1) – vertebrae (1) • Short (1) – carpals (1), tarsals (1) • Sesamoid (1) – patella (1). 	<p>4</p> <p>AO1=4</p>
11(a)	<p>State a place in the body where a fixed joint would be found.</p> <p>Award one mark for the correct response.</p> <ul style="list-style-type: none"> • Skull (1) • Pelvis (1). 	<p>1</p> <p>AO1=1</p>
11(b)	<p>Figure 1 shows the knee joint.</p> <p>Identify the structures of the knee joint labelled A, B and C in Figure 1.</p> <p>Award one mark for each of the following answers.</p> <p>A = (1) Ligament B = (1) Articulating cartilage C = (1) Synovial fluid.</p>	<p>3</p> <p>AO1=3</p>

11 (c)	<p>Figure 2 shows two movements (A to B and B to C) that occur at the knee.</p> <p>Complete Table 1 by identifying the joint action occurring at the knee from position A to B (raising) and from position B to C (lowering) and the agonist muscles causing these two actions.</p> <p style="text-align: center;">Table 1</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th></th><th>A to B</th><th>B to C</th></tr> <tr> <td>Joint action</td><td>Flexion (1)</td><td>Extension (1)</td></tr> <tr> <td>Agonist muscle</td><td>Hamstrings (1)</td><td>Quadriceps (1)</td></tr> </table>		A to B	B to C	Joint action	Flexion (1)	Extension (1)	Agonist muscle	Hamstrings (1)	Quadriceps (1)	<p>4</p> <p>AO2=4</p>
	A to B	B to C									
Joint action	Flexion (1)	Extension (1)									
Agonist muscle	Hamstrings (1)	Quadriceps (1)									
11 (d)	<p>Using Figure 2, identify the type of muscle contraction occurring at the agonist muscle from position A to position B.</p> <p>Justify your choice.</p> <p>Award one mark for the identification of the type of muscle contraction and one mark for the justification.</p> <ul style="list-style-type: none"> • Concentric (1) • The agonist (hamstrings) is contracting/shortening (1). <p>NB If muscle contraction is incorrect, but definition correct, 0 marks to be awarded.</p>	<p>2</p> <p>AO2=1</p> <p>AO3=1</p>									
12 (a)	<p>Figure 3 shows the structure of the spine.</p> <p>Identify the regions of the spine labelled A, B, C and D in Figure 3.</p> <p>Award one mark for each of the following answers.</p> <p>A = Cervical (1) B = Thoracic (1) C = Lumbar (1) D = Sacrum (1).</p>	<p>4</p> <p>AO1=4</p>									
12 (b)	Figure 4 shows a diagram of the spine.	1									

	<p>State the postural condition shown.</p> <p>Award one mark for the correct response.</p> <ul style="list-style-type: none"> • Lordosis (1). 	<p>AO3=1</p>
12 (c)	<p>Explain why posture is important to an individual when they are taking part in health and fitness activities.</p> <p>Award one mark for each correct explanation of why posture is important when taking part in health and fitness activities.</p> <ul style="list-style-type: none"> • Good posture allows your muscles to work efficiently so technique of an action will be of a high standard (1). • Good posture places your body in a position where the stress on supporting ligaments, tendons and muscles is limited (1). • Poor posture means your muscles are unable to work properly which means an individual may develop an injury (1). • Good posture allows your muscles to work efficiently so they fatigue less quickly (1). <p>Credit other suitable responses.</p>	<p>4</p> <p>AO3=4</p>
13 (a)	<p>Identify the type of muscular strength that is needed when swimming 25 metres.</p> <p>Justify your choice.</p> <p>Award one mark for identifying the strength and one mark for the justification.</p> <ul style="list-style-type: none"> • Dynamic (1) • Repeated contractions applied to propel the moving body through the water over a period of time (1). <p>Credit other suitable responses.</p> <p>NB If type of muscle strength is incorrect, but definition correct, 0 marks to be awarded.</p>	<p>2</p> <p>AO2=1</p> <p>AO3=1</p>
13 (b)	<p>Define speed and reaction time and give one example of when you would use each in a health and fitness activity.</p>	<p>4</p> <p>AO1=2</p>

	<p>Award one mark for the definition and one mark for an example.</p> <ul style="list-style-type: none"> Speed – the maximum rate at which an individual is able to perform a movement or cover a distance in a period of time (1) for example, an individual sprinting as part of a fitness circuit (1). Reaction time – the time taken to initiate a response to a stimulus (1) for example, an individual reacting to the stimulus of a gun/whistle to start a race (1). <p>Credit other suitable responses.</p>	<p>AO2=2</p>
14 (a)	<p>Define the terms ‘health’ and ‘fitness’.</p> <p>Award one mark for a correct definition.</p> <p>Health</p> <ul style="list-style-type: none"> A state of complete physical, mental and social wellbeing and not merely the absence of disease (1). <p>Fitness</p> <ul style="list-style-type: none"> The ability to cope with daily demands without suffering undue fatigue (1). <p>Credit other suitable responses.</p>	<p>2</p> <p>AO1=2</p>
14 (b)	<p>Being in good health is essential if individuals want to take part in health and fitness activities.</p> <p>Discuss whether you think this statement is true or false.</p> <p>Award one mark for each discursive point as to whether the statement is true or false up to a maximum of four marks.</p> <ul style="list-style-type: none"> Being in good physical health will mean that individuals can physically cope with participating in health and fitness activities (1) It is possible to be unhealthy (suffer from a mental illness) but still be able to participate in health and fitness activities (1) If a person suffers from poor social health, they will not be able to join in health and fitness activities where they must mix with others (1) A person who suffers from poor social health, however, could still take part in activities such as jogging where they do not have to mix with others (1). 	<p>4</p> <p>AO3=4</p>

	Credit other suitable responses.	
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15 (a)	<p>Describe an endomorph body shape.</p> <p>Award up to two marks for describing an endomorph body shape.</p> <ul style="list-style-type: none"> • Pear-shaped body (1) • High fat content (1). <p>Credit other suitable responses.</p>	<p>2</p> <p>AO1=2</p>
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15 (b)	<p>Identify a health and fitness activity that an endomorph could choose to do if they wanted to change their body shape to:</p> <ul style="list-style-type: none"> • Mesomorph body shape • Ectomorph body shape. <p>Justify your choice.</p> <p>Award one mark for a health and fitness activity and one mark for the justification ensuring it is specific to the identified activity and body shape they are working towards.</p> <p>Mesomorph</p> <ul style="list-style-type: none"> • Activity – weight training / cardio based activities e.g. running, cycling, swimming (1) • Justification – as this will help develop muscle and a mesomorph body shape is muscular (1). <p>Ectomorph</p> <ul style="list-style-type: none"> • Activity – cardio based activities e.g. running, cycling, swimming / HIIT training (1) • Justification – as this will promote weight loss and an ectomorph body shape is thin and lean (1). <p>Credit other suitable responses.</p>	<p>4</p> <p>AO2=2</p> <p>AO3=2</p>
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16 (a)	<p>Overload is one principle of training.</p> <p>State three other principles of training and how an individual could apply these in health and fitness activities.</p> <p>Award one mark for the principle of training and one mark for the application.</p> <ul style="list-style-type: none"> • Specificity (1) – an individual could ensure that the health and fitness activities they choose to do will work the type of fitness they want to improve (1). • Progression (1) – an individual should gradually increase their workload so that the body adapts and gets fitter without causing injury (1). • Reversibility (1) – an individual will make sure they do not take a long break from their health and fitness activities as this could cause them to lose fitness (1). • Tedium (1) – an individual will vary the type of health and fitness activities they do so that they do not become bored and stop participating (1). <p>Credit other suitable responses.</p>	<p>6</p> <p>AO1=3</p> <p>AO2=3</p>
16(b)	<p>Explain two ways an individual could use overload in health and fitness activities.</p> <p>Award one mark for each explanation of how an individual could use overload in health and fitness activities.</p> <ul style="list-style-type: none"> • Frequency – an individual could increase their participation in health and fitness activities from two to three times per week (1). • Intensity – an individual could make their participation in health and fitness activities harder by working at a greater speed (1). • Time – an individual could increase the time they participate in health and fitness activities from 30 to 40 minutes (1). • Type – an individual could change the type of health and fitness activities they participate in from running to swimming (1). <p>Credit other suitable responses.</p>	<p>2</p> <p>AO2=2</p>

Section 3

Total for this section: 21 marks

17	<p>The human body has different types of muscle.</p> <p>Discuss how these different types of muscle enable an individual to participate in health and fitness activities effectively.</p> <table><tr><th>Marks</th><th>Description</th></tr><tr><td>5-6</td><td><p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p><p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p><p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p></td></tr><tr><td>3-4</td><td><p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but not always consistently.</p><p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors.</p><p>Analysis and evaluation is present and effective, but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p></td></tr><tr><td>1-2</td><td><p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p><p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p></td></tr></table>	Marks	Description	5-6	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>	3-4	<p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but not always consistently.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors.</p> <p>Analysis and evaluation is present and effective, but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p>	1-2	<p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p>	<p>6</p> <p>AO1=2</p> <p>AO2=2</p> <p>AO3=2</p>
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		Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.	
	0	No relevant material	
	<p>Indicative content</p> <ul style="list-style-type: none"> • The different types of muscle are: <ul style="list-style-type: none"> - cardiac - smooth - skeletal. • Cardiac muscle is found in the heart <ul style="list-style-type: none"> - its role is to aid blood flow through the heart which pumps blood around the body. - the blood then carries oxygen around the body to the working muscles in health and fitness activities. - oxygen is needed to provide energy during health and physical activities. - therefore, without the cardiac muscle, participation on physical activity would not be possible. • Smooth muscle is found in multiple locations including digestive tract, blood vessels and lungs. <ul style="list-style-type: none"> - it aids with digestion and helps distribute blood around the body - to provide energy for exercise, food that is eaten needs to be broken down - smooth muscle in the digestive system carries this out so that there is a supply of energy in the body - blood vessels aid the flow of blood around the body. As with the cardiac muscle this provides oxygen to the muscles so that physical activity can take place. • Skeletal muscle is found around the body. <ul style="list-style-type: none"> - its role is to aid with movement - muscles are attached to bones by tendons and when they contract, they move the skeletal system - this movement is what allows an individual to physically move and participate in health and fitness activities. <p>Credit other suitable responses.</p>		
18	<p>Harry has been to the doctors and his blood pressure has been measured at 140/90mmHg.</p> <p>Discuss whether this blood pressure level is healthy and give reasons why it may be at this level.</p>		<p>6</p> <p>AO1=2</p> <p>AO2=2</p>

	Marks	Description	AO3=2
	5-6	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>	
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	<p>Indicative content</p> <ul style="list-style-type: none"> • The ideal blood pressure range is between 90/60mmHg and 120/80mmHg. • A blood pressure of 140/90mmHg is deemed as high. 		

	<ul style="list-style-type: none"> • This is unhealthy and could lead to an individual suffering from many illnesses e.g. heart disease. • It will also mean that an individual will struggle to exercise as the strain of the blood pressure on the body is too great. • Low physical activity levels <ul style="list-style-type: none"> - People who are inactive tend to have higher resting heart rates. The higher your resting heart rate, the harder your heart must work with each contraction and the stronger the force on your arteries. Lack of physical activity also increases the risk of being overweight. • Diet <ul style="list-style-type: none"> - Too much fat in your diet could cause narrowing of the arteries which increases blood pressure. The thinner vessels will have more pressure on them as blood is pumped through them. - Too much salt (sodium) in your diet. Too much sodium in your diet can cause your body to retain fluid, which increases blood pressure - Too little potassium in your diet. Potassium helps balance the amount of sodium in your cells. If you don't get enough potassium in your diet or retain enough potassium, you may accumulate too much sodium in your blood. - A poor diet could have caused the individual to be overweight or obese. The more you weigh, the more blood you need to supply oxygen and nutrients to your tissues. As the volume of blood circulating through your blood vessels increases, so does the pressure on your artery walls. • Age <ul style="list-style-type: none"> - The risk of high blood pressure increases as you age. Until about age 64, high blood pressure is more common in men. Women are more likely to develop high blood pressure after age 65. • Stress <ul style="list-style-type: none"> - High levels of stress can lead to a temporary increase in blood pressure. If you try to relax by eating more, using tobacco or drinking alcohol, you may only increase problems with high blood pressure. <p>Credit other suitable responses.</p>	
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19	<p>Explain how the structure and function of the blood vessels in the cardiovascular system help an individual taking part in health and fitness activities.</p>	9										
		AO1=3										
		AO2=3										
		AO3=3										
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	<p>Indicative content</p> <ul style="list-style-type: none"> • Arteries <ul style="list-style-type: none"> - Thick, muscular walls. - Carry blood away from the heart to the body. - Carry oxygenated blood. - Carry blood under high pressure. - Their main role is to pump oxygenated blood around the body to the parts of the body that need it most. - When taking part in health and fitness activities the arteries transport blood to the muscles that are exercising. - Small arteries can widen (vasodilation) to allow more blood to flow to these working muscles. At the same time, less blood will be directed to other parts of the body where demand is not great. This is called the vascular shunt mechanism. - This allows the body to move and exercise in health and fitness activities and if the oxygenated blood wasn't getting to the muscles the individual would have to stop exercising. • Veins <ul style="list-style-type: none"> - Thin walls. - Contain valves to ensure blood flows in one direction - Carry blood to the heart. - Carry deoxygenated blood. - Carry blood under low pressure. - The veins help with exercise as they carry carbon dioxide and waste products to the lungs so they can be breathed out of the body. - If carbon dioxide wasn't removed, then an individual would not be able to exercise. • Capillaries <ul style="list-style-type: none"> - Smallest blood vessels with very thin walls. - They join arteries and veins. - Oxygen and dissolved foods diffuse from blood in the capillaries into the surrounding tissues to provide energy for exercise in health and fitness activities. - At the same time, they allow carbon dioxide to diffuse from the tissues into the blood which then flows into veins. - They also allow the same process to occur in the lungs in the form of gaseous exchange. • All the vessels are part of one big interlinked system which allows the body to move and exercise. <p>Credit other suitable responses.</p>	
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Assessment Objective Grid

Question	AO1	AO2	AO3	Total
1	1			1
2	1			1
3	1			1
4	1			1
5	1			1
6	1			1
7		1		1
8		1		1
9	2			2
10	4			4
11 (a)	1			1
11 (b)	3			3
11 (c)		4		4
11 (d)		1	1	2
12 (a)	4			4
12 (b)			1	1
12 (c)			4	4
13 (a)		1	1	2
13 (b)	2	2		4
14 (a)	2			2
14 (b)			4	4
15 (a)	2			2
15 (b)		2	2	4
16 (a)	3	3		6
16 (b)		2		2
17	2	2	2	6
18	2	2	2	6
19	3	3	3	9
Total	36	24	20	80