

Mark Scheme (Results)

January 2019 (1901)

BTEC Level 3 National in Health and  
Social Care

Unit 3: Anatomy and Physiology for  
Health and Social Care (31493H)



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# Unit 3: Anatomy and physiology for Health and Social Care

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## General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do, rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

## Specific marking guidance

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The marking grids have been designed to assess learner work holistically.

Rows in the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

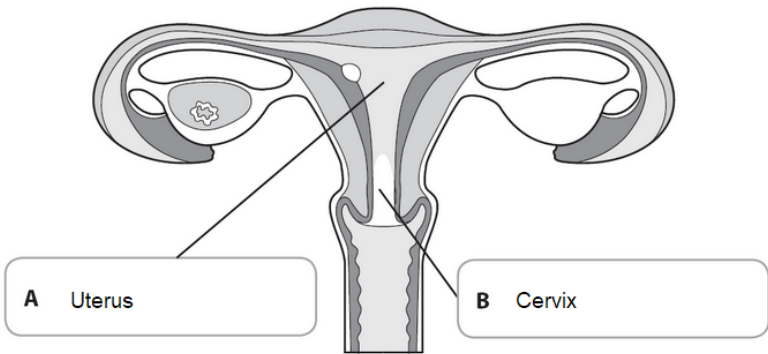
- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer, in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band, depending on how they have evidenced each of the descriptor bullet points.

## BTEC Mark Scheme

### Health and Social care Unit 3 version 1 1901

Question Number	Answer	Mark
1b	<p>Award <b>one</b> mark for each descriptive point up to a total of <b>two</b> marks for each structure.</p> <p><b>Golgi apparatus:</b></p> <p>Packages/stores proteins/lipids (1)</p> <p>Makes vesicles (1).</p> <p><b>Centrioles:</b></p> <p>Involved in cell division (1)</p> <p>They make the spindle (1)</p> <p>Separate chromosomes (1)</p> <p>Hold the nucleus in position (1)</p> <p>Required for meiosis/mitosis (1)</p> <p>Accept any other relevant phrasing/wording.</p>	4

Question Number	Answer	Mark
1c	<p>Award each descriptive point, to a maximum of two for each kind of division,</p> <p>Mitosis (1) produces 2 cells/identical cells/somatic cells (1).            Meiosis (1) produces 4 cells/non-identical/ half the DNA/gametes/haploid cells/varied DNA (1).            One kind of division is for growth (1) the other is to produce sex cells/sperm/eggs (1)</p> <p>Award any appropriate alternative.</p>	4

Question Number	Answer	Mark
2a	 <p>A. Uterus (1)            B. Cervix (1)</p>	2

Question Number	Answer	Mark
2b	<p>Amniocentesis (1) test fluid from the amniotic sac/around the foetus (1).</p> <p>Chorionic villus sampling (CVS) (1) test tissue from the chorion/membranes./foetal tissue/placenta (1)</p> <p>Accept any other relevant phrasing/wording.</p>	4

Question Number	Answer	Mark
2c	<p>Award <b>one</b> mark for each identification and <b>one</b> mark each expansion to a maximum of <b>four</b> marks.</p> <p>Blocks the fallopian tube (1) so the egg cannot get to the uterus/sperm does not reach the egg (1).</p> <p>Prevents adhesion of the egg (1) so it cannot develop (1).</p> <p>Tissue grows in the uterus (1) so the egg cannot implant (1)</p> <p>Tissue grows on/in ovaries (1) preventing egg release (1)</p> <p>Accept any other valid response/wording.</p>	4

Question Number	Answer	Mark
3a	<p>Award <b>one</b> mark for each descriptive point to a maximum of <b>four</b> marks.</p> <p>Do not award more than <b>three</b> marks for either system.</p> <p><b>Peripheral</b></p> <p>It relays signals from the CNS system to the rest of the body (1).</p> <p>It brings messages from the sensory organs (1).</p> <p>It takes messages to the muscles/extremities (1).</p> <p><b>Central</b></p> <p>Coordinates messages from the peripheral nervous system (1).</p> <p>Controls involuntary responses (1).</p> <p>Coordinates reflexes (1).</p> <p>Credit specific examples, but do not credit repetition.</p> <p>Accept any other valid response.</p>	4

Question Number	Answer	Mark
3b	<p>Award <b>one</b> mark for identification and <b>one</b> mark for expansion to a maximum of <b>two</b> marks for each time.</p> <p>Isometric (1) muscle length does not change (1).</p> <p>Concentric (1) muscle length shortens (1).</p> <p>Eccentric (1) muscle lengthens (1).</p>	4

Question Number	Answer	Mark
3c	<p>Award <b>one</b> mark for each point to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• The eyes see the object (1).</li> <li>• A message is sent down the optic nerve (1) received in the brain (1).</li> <li>• The brain sends a message to the muscles/down the motor neurones (1).</li> <li>• The muscles relax/contract (1).</li> <li>• The arm moves to the object (1).</li> <li>• Another nerve impulse causes the hand muscles to contract/pick up (1).</li> </ul> <p>Accept any other valid response.</p>	4

Question Number	Indicative content	Mark
3d	<p>Responses may include the following.</p> <p>Symptoms include:</p> <ul style="list-style-type: none"> <li>• vision problems.</li> <li>• tingling and numbness.</li> <li>• pains and spasms.</li> <li>• weakness or fatigue.</li> <li>• balance problems or dizziness.</li> </ul> <p>cognitive problems.</p> <p>sexual dysfunction.</p> <p>bladder issues.</p> <p>MS is an autoimmune condition, which means your immune system mistakes part of your body for a foreign substance and attacks it.</p> <p>In MS, it attacks the myelin sheath in the brain and/or spinal cord. This is the layer that surrounds your nerves, protecting them and helping electrical signals travel from the brain to the rest of the body.</p> <p>The attacks cause the myelin sheath to become inflamed in small patches (plaques or lesions).</p> <p>These patches of inflammation can disrupt the messages travelling along the nerves. It can slow them down, jumble them, send them the wrong way, or stop them from getting</p>	6

		<p>through completely.</p> <p>This disruption leads to the symptoms and signs of MS.</p> <p>When the inflammation goes away, it can leave behind scarring of the myelin sheath (sclerosis).</p> <p>These attacks, particularly if frequent and repeated, can eventually lead to permanent damage to the underlying nerves.</p> <p>Accept any other valid response.</p>	
Level	Mark	Descriptor	
Level 0	0	No rewardable material.	
Level 1	1-2	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of knowledge and understanding.</li> <li>• Generic statements may be presented rather than linkages being made.</li> <li>• Lines of reasoning are unsupported.</li> </ul>	
Level 2	3-4	<ul style="list-style-type: none"> <li>• Demonstrates mostly accurate knowledge and understanding.</li> <li>• Answers evidences occasional linkages among the elements in the context of the question.</li> <li>• Lines of reasoning occasionally supported through the application of recent evidence.</li> </ul>	
Level 3	5-6	<ul style="list-style-type: none"> <li>• Demonstrates accurate and thorough knowledge and understanding.</li> <li>• Answer evidences comprehensive linkages among the elements in the context of the question.</li> <li>• Lines of reasoning supported throughout by sustained application of relevant evidence.</li> </ul>	



Question Number	Answer	Mark
4a	<p>Award <b>one</b> mark for identification and <b>one</b> additional mark for appropriate expansion.</p> <ul style="list-style-type: none"> <li>• They are in pairs (accept specific examples) (1) causing movement when one contracts (1).</li> </ul> <p>Accept any other relevant phrasing/wording.</p>	2

Question Number	Answer	Mark
4b	<p>Award <b>one</b> mark for each point to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• It is made up of fibres (1).</li> <li>• These contain sarcomeres (1).</li> <li>• They have a striped appearance (1).</li> <li>• They contain a lot of mitochondria (1).</li> <li>• They are multinucleated (1).</li> <li>• They contain actin(1)</li> <li>• and myosin molecules (1)</li> </ul> <p>Accept made of protein if actin/myosin not mentioned. Credit accurate diagrams with the points outlined above</p> <p>Accept any other relevant phrasing/wording</p>	4

Question Number	Indicative content		Mark
4c	<p>Responses may include the following.</p> <ul style="list-style-type: none"> <li>• It is a collection of several different muscle wasting conditions.</li> <li>• Duchenne is the most common type.</li> <li>• Duchenne and Becker MS only affect boys, it is a sex-linked genetic disorder where muscle fibres break down causing gradual weakening.</li> <li>• Dystrophin is a protein in muscle that is not formed properly.</li> <li>• Life expectancy is shortened.</li> <li>• There is no cure.</li> <li>• Physiotherapy and corrective surgery can help in some cases.</li> <li>• The weakening of the breathing muscles may cause respiratory difficulty.</li> <li>• There is a progressive inability to walk.</li> <li>• They may suffer from cardiomyopathy.</li> </ul> <p>Accept any other valid response.</p>		6
Level	Mark	Descriptor	
Level 0	0	No rewardable material.	
Level 1	1-2	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of knowledge and understanding.</li> <li>• Generic statements may be presented rather than linkages being made.</li> <li>• Lines of reasoning are unsupported.</li> </ul>	
Level 2	3-4	<ul style="list-style-type: none"> <li>• Demonstrates mostly accurate knowledge and understanding.</li> <li>• Answers evidences occasional linkages among the elements in the context of the question.</li> <li>• Lines of reasoning occasionally supported through the application of recent evidence.</li> </ul>	
Level 3	5-6	<ul style="list-style-type: none"> <li>• Demonstrates accurate and thorough knowledge and understanding.</li> <li>• Answer evidences comprehensive linkages among the elements in the context of the question.</li> <li>• Lines of reasoning supported throughout by sustained application of relevant evidence.</li> </ul>	

Question Number	Answer	Mark
5a	<p>Award <b>one</b> mark for each identification to a maximum of <b>two</b> and <b>one</b> additional mark for each appropriate expansion to a maximum of <b>two</b>. Total <b>four</b></p> <ul style="list-style-type: none"> <li>• Hormones can raise/lower blood sugar levels (1) to keep them correct (1)</li> <li>• Glucagon (1) increases blood glucose levels (1)</li> <li>• Blood sugar raised (1) as glycogen is changed to glucose (1).</li> <li>• Insulin (1) reduces the blood glucose levels (1)</li> <li>• Blood sugar lowered (1) as glucose is stored as glycogen. (1).</li> <li>• Adrenalin (1) raises blood sugar levels (1).</li> </ul> <p>Accept any other relevant phrasing/wording.</p>	4

Question Number	Answer	Mark
5b	<p>Award <b>one</b> mark for each function to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• Produce urine (1)</li> <li>• Filter toxins/waste products/urea (1).</li> <li>• Regulate water (1).</li> <li>• Regulate salt balance (1).</li> <li>• Regulate pH (1).</li> <li>• Reabsorbs glucose</li> <li>• Reabsorbs useful small molecules</li> </ul> <p>Accept appropriate examples but do not credit repetition. Accept any other appropriate answer/wording.</p>	4

Question Number	Answer	Mark
5c	<p>Award <b>one</b> mark for each identification to a maximum of <b>two</b> marks and <b>one</b> mark for each appropriate linked expansion, to a total of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• Organ failure (accept specific accurate examples) (1) as water is needed for normal functioning (1)</li> <li>• Reduced blood pressure (1) as water is the main constituent of blood (1).</li> <li>• Brain damage (1) as the brain is cushioned by fluid (1).</li> <li>• Sweating is reduced (1) as there is less water in the blood (1).</li> <li>• Cystitis (1) due to more concentrated urine (1).</li> <li>• Headaches (1) due to reduction of water around the brain (1).</li> <li>• Constipation (1) due to change in stool consistency (1)</li> <li>• Reduced urination/concentrated urine (1) leading to retention of toxins (1)</li> <li>• Confusion/dizziness(1) as brain function shuts down (1)</li> <li>• Dry mouth/throat (1) causing problem swallowing (1)</li> <li>• Dry skin (1) leading to irritation/itchiness (1)</li> </ul> <p>Accept any other valid response.</p>	4

Question Number	Indicative content	Mark
5d	<p>Responses may include the following.</p> <ul style="list-style-type: none"> <li>• Temperature is normally controlled by negative feedback.</li> <li>• Negative feedback is the inhibition of a process by its result.</li> <li>• Heat is produced in the body as a by-product of respiration and by brown adipose tissue.</li> <li>• Heat is lost through the skin, this can be increased by evaporation of sweat.</li> <li>• The hypothalamus contains thermoreceptors.</li> <li>• The autonomic nervous system controls constriction and dilation of arterioles.</li> <li>• This controls blood flow near the surface, regulating heat loss.</li> </ul>	8

	<ul style="list-style-type: none"> <li>• People with a larger surface area to volume ratio lose heat more quickly, this is particularly evident in small children.</li> <li>• Adipose tissue insulates the body, this is reduced in young children/the elderly.</li> <li>• In fevers the internal 'thermostat' is reset leading to a raised temperature, which can be dangerous.</li> <li>• Piloerection/hairs raised insulates the skin.</li> <li>• Shivering causes heat production through muscle movement</li> </ul>	
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-3 marks	A few key points identified, <b>or</b> one point described in some detail. The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question.	
2 4-6 marks	Some points identified, <b>or</b> a few key points described. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear.	
3 7-8 marks	Range of points described, <b>or</b> a few key points explained in depth. The majority of points made will be relevant and there will be a clear link to the situation in the question.	

Question Number	Indicative content	Mark
6a	<p>Award <b>one</b> mark for each point to a maximum of <b>four</b> marks. Do not award more than three marks for answers that refer to only England or Oxford.</p> <ul style="list-style-type: none"> <li>• They were the same in 1967 (1).</li> <li>• Most years England has a higher rate than Oxford (1).</li> <li>• The pattern of the incidences is similar until 2003 (1).</li> <li>• From 2003 the incidence in England has increased more quickly than that in Oxford. (1).</li> <li>• In 2011 the rate in England is more than double that in Oxford (1).</li> <li>• In 1993 and 1996/7 the rate dropped to zero in Oxford (1).</li> </ul> <p>Accept reversed arguments, do not credit repetition.</p> <p>Accept any other valid response and other wording. Credit where accurate figures have been quoted that match the statements above</p>	4

Question Number	Answer	Mark
6b	<p>Award <b>one</b> mark for the identification and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>two</b> marks.</p> <ul style="list-style-type: none"> <li>• The study of the pattern of a disease/epidemic (may be a specific disease) (1) in a population/group of people/over time/in different geographical areas/ in different classes (1).</li> </ul> <p>Accept any other relevant phrasing/wording.</p>	2

Question Number		Indicative content	Mark
6c		<ul style="list-style-type: none"> <li>• Rickets is a skeletal problem caused by low calcium and or reduced vitamin D levels.</li> <li>• Vitamin D is derived from the diet and sunlight.</li> <li>• Calcium is derived from the diet.</li> <li>• Change in diet, people are eating less/more dairy products containing calcium.</li> <li>• Change in leisure activities, people spending less time outside.</li> <li>• Cultural changes, less exposed skin (e.g. burkhas) leading to reduced vitamin D levels.</li> <li>• Immigration/differential birth rates, people with increased melanin in their skin make less vitamin D.</li> <li>• Health education about melanoma has had unforeseen consequences.</li> </ul>	6
Level	Mark	Descriptor	
Level 0	0	No rewardable material.	
Level 1	1-2	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of knowledge and understanding.</li> <li>• Generic statements may be presented rather than linkages being made.</li> <li>• Lines of reasoning are unsupported.</li> </ul>	
Level 2	3-4	<ul style="list-style-type: none"> <li>• Demonstrates mostly accurate knowledge and understanding.</li> <li>• Answers evidences occasional linkages among the elements in the context of the question.</li> <li>• Lines of reasoning occasionally supported through the application of recent evidence.</li> </ul>	
Level 3	5-6	<ul style="list-style-type: none"> <li>• Demonstrates accurate and thorough knowledge and understanding.</li> <li>• Answer evidences comprehensive linkages among the elements in the context of the question.</li> <li>• Lines of reasoning supported throughout by sustained application of relevant evidence.</li> </ul>	

Question number	Indicative content
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7

**One** mark for each correct point to a maximum of **eight** marks.

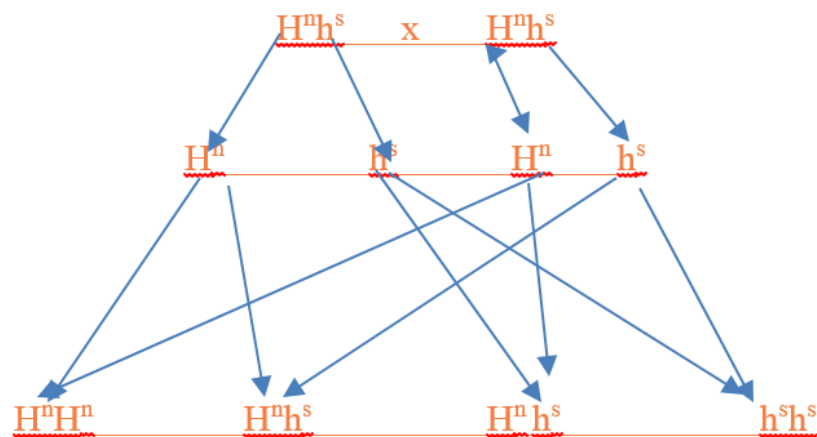
Learners may use various characters to represent alleles.

- Their genotype is heterozygous (1) Hh (1).
- Normal type is homozygous dominant (1) HH (1).
- Sickle cell disease sufferers are homozygous recessive (1) hh (1).
- Alleles are codominant (1)
- Ratio of children will be 1:2:1 (1).
- So, 25% normal (1) 50% have the trait (1) 25% have the disease (1).

Up to **three** marks may be awarded for evidence in the pedigree/punnet square. Take care not to mark repetition.

Up to **two** marks for correct parental alleles. **One** mark for correct method (award even if alleles are incorrect).

	H	h
H	HH	Hh
h	Hh	hh





Ofqual



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government



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