



MARKING SCHEME

SUMMER 2019

**LEVEL 3 DIPLOMA/CERTIFICATE IN MEDICAL
SCIENCE - UNIT 1
4463U10-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

WJEC DIPLOMA/ CERTIFICATE IN MEDICAL SCIENCE
MARK SCHEME- UNIT 1 HUMAN HEALTH AND DISEASE SUMMER 2019

General Instructions

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

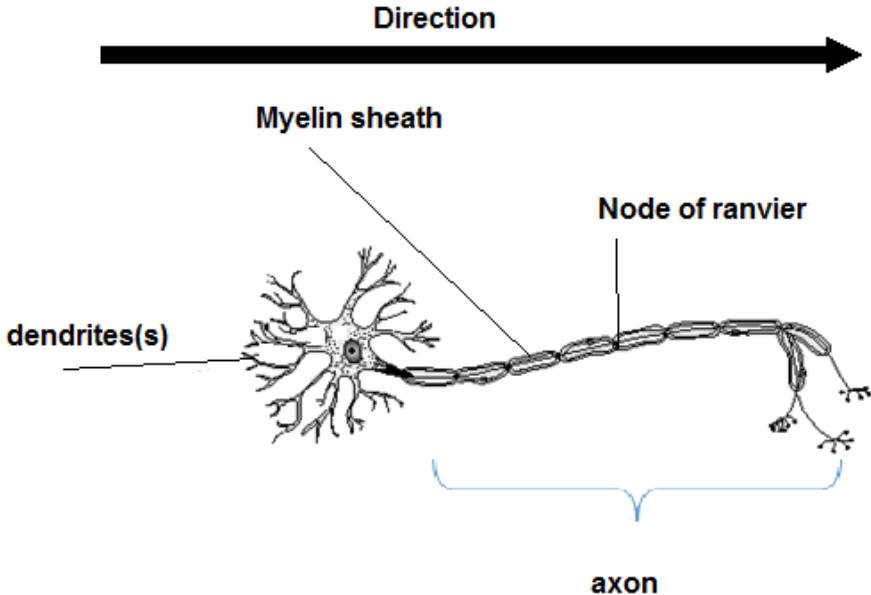
Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao	= correct answer only
ecf	= error carried forward
bod	= benefit of doubt

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
1			Any 3 for 1 mark from: • Genetics • Lack of sunlight and vitamin D • Smoking • Viral Infections	1			1			
2		(b)	Direction 	1 4		1 4				
		(a)	Drawing – 1 mark three structures clearly labelled for 3 marks							

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
3			Any 2 from the following- 1 mark for symptom, 1 mark for correct control measure/ treatment. • Fatigue (1); Drug amantadine/ exercise/ healthy sleep patterns/ avoiding painkillers.(1) • Visual problems (1); Steroid treatment for severe symptoms/ medication gabapentin(1); • Muscle spasms and stiffness(1); Physiotherapy/ stretching exercises/ muscle relaxants (1); • Mobility problems (1); Physiotherapist supervised exercise/vestibular rehabilitation/ medication for dizziness or tremors/walking sticks or wheelchair/ stair lift (1); • Neuropathic pain (1); Medication to stop tabbing pain e.g. carbamazepine or antidepressants(1); • Musculoskeletal pain(1); Physiotherapy/ painkillers/ TENS machine(1); • Emotional problems (1); Antidepressants / cognitive behavioral therapy(1); • Bladder problems(1); medications for overactive bladder/ catheter(1); • Bowel problems(1); Diet and laxatives/ anti-diarrhea medication(1) • Speech problems (1)Speech therapy(1) • swallowing difficulties(1) ; stomach tube (1) Treatment must link to symptom	4			4			

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
4	(a)	(i)	Total in UK Nations = 106 228 Total confirmed England = 87 686 % MS Sufferers in England = $\frac{87686}{106228} \times 100$ (1) = 82.55/82.6/83 % (1) Answer only (2)	2				2		
		(ii)	Any 2 × (1) from: More smokers(1) during winter less sunlight in Scotland as further north than England (1) diets potentially lacking in vitamin D (1) lower population so smaller gene pool - prevalence of MS gene higher (1) Viral infection outbreak in Scotland e.g. Epstein-Barr Virus	2			2			
		(iii)	Lower population in Scotland (but higher rate of MS diagnosis per 100 000 population).	1				1		
	(b)	(i)	bar graph (1) plots (1)(±< 1 small square) axes and scale (1) labelled correctly with units (1) line graph max 3 marks- axes, labels and units, correct plots	4						4
		(ii)	Females = 3 568 Males = 1 473 $\frac{3568}{1473}$ (1) = 2.42 / 2.4 / 242% (1) Correct answer only (2)	2				2		
	(c)		Any 2 for (1) from: Stop smoking More exercise Healthy eating Flu jab AVP	1						1

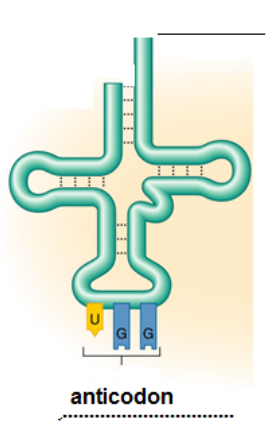
Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
5	(a)		Description (1)- The percentage of people with MS that are in employment in UK decreases as the number of years after diagnosis increases. Explanation (1)- this is because MS is a progressive condition /that affects a person's mobility (and coordination/ sight/ other problems which would prevent them from continuing working) OR- MS slightly lowers life expectancy therefore as time after diagnosis increases they may not live as long as people without MS.	2						2
	(b)		Diagnosis is between 20-40 yrs old so may have retired by 30+ years after diagnosis/ could be dead/reduced life expectancy	1				1		
Total Section A				25	0	5	8	6	0	6

SECTION B

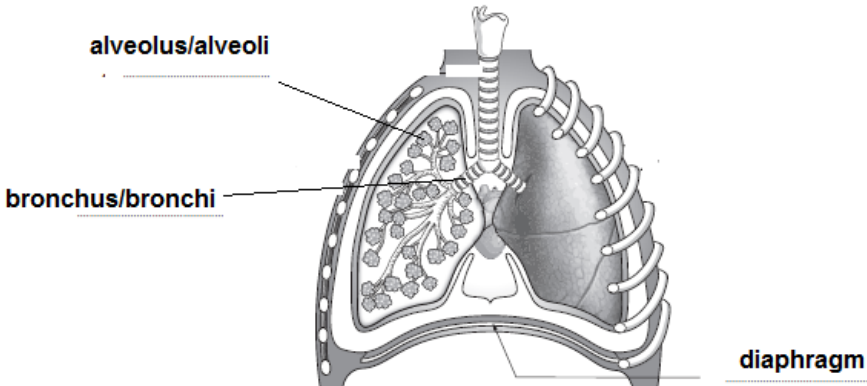
Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3										
6.	(a)		4 correct – 3 marks 3 correct- 2 marks 2/1 correct – 1 mark <table border="1"><tr><td>Structure</td><td>Letter from diagram</td></tr><tr><td>Capillary</td><td>C</td></tr><tr><td>sebaceous gland</td><td>B/Z</td></tr><tr><td>erector muscle</td><td>F</td></tr><tr><td>hair follicle</td><td>G</td></tr></table>	Structure	Letter from diagram	Capillary	C	sebaceous gland	B/Z	erector muscle	F	hair follicle	G	3		3				
Structure	Letter from diagram																			
Capillary	C																			
sebaceous gland	B/Z																			
erector muscle	F																			
hair follicle	G																			
	(b)		Structure D- Sweat gland (1); Produces (more) sweat that evaporates from the skin surface (taking heat with it) owtte/ ORA(1); Structure E- Hair (1); Stands on end (when body temperature drops)- traps a layer of air (which is heated by body heat and insulates the body/ owtte/ ORA) Accept converse (1); Do not allow ecf for function	4		4														
	(c)		Leucocyte Not: white blood cell	1		1														
Total Question 6				8		8														

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
7	(a)		Organelle A = (Rough) <u>endoplasmic reticulum</u> (1) Not Smooth endoplasmic reticulum, accept ribosomes Organelle B = Golgi body/ apparatus (1) Organelle C = Mitochondrion/mitochondria (1)	3	3					
	(b)		• Arranged as a phospholipid bilayer (1) Can be given for labelling diagram + Any 3 × (1) from: • Hydrophilic heads {on outside/towards cell cytoplasm} (1) • towards the aqueous environment /as this is an aqueous environment(1) • hydrophobic tails {on inside / away from cytoplasm} (1) • away from aqueous environment / to avoid the aqueous environment (1) Not away from / towards water	4	4					
Total Question 7				7	7					

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3											
8	(a)		<table><thead><tr><th>DNA</th><th>RNA</th></tr></thead><tbody><tr><td>Double stranded</td><td>Single stranded</td></tr><tr><td>(Pentose sugar) deoxyribose</td><td>(Pentose sugar) ribose</td></tr><tr><td>Bases: ATCG</td><td>Bases: AUCG</td></tr><tr><td>longer</td><td>shorter</td></tr></tbody></table> one mark for each correct comparison correct spelling of bases adenine, cytosine, guanine, uracil, thymine	DNA	RNA	Double stranded	Single stranded	(Pentose sugar) deoxyribose	(Pentose sugar) ribose	Bases: ATCG	Bases: AUCG	longer	shorter	3	3						
DNA	RNA																				
Double stranded	Single stranded																				
(Pentose sugar) deoxyribose	(Pentose sugar) ribose																				
Bases: ATCG	Bases: AUCG																				
longer	shorter																				
	(b)	(i)	Guanine (1) Double ring structure (1)	2	2																
		(ii)	Joined by hydrogen bonds (1) during complementary base pairing (1)	2	2																

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
	(c)	(i)		2	2					
		(ii)	Any 5 × (1) from: • Attachment on ribosomes by mRNA (1) • mRNA attaches to small subunit (1) • tRNA binds to large subunit (1) • tRNA carries an amino acid.(1) • Ribosome binds to start codon on mRNA.(1) • codon- anticodon interactions(1) • Peptide bond formed between two amino acids. (1) • Ribosome moves along mRNA one codon at a time (1) • Use of ATP in process (1)	5	5					
Total Question 8				14	14	0	0	0	0	0

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
9	(a)	(i)	Any 3 × (1) from : • Women have a higher prevalence for osteoarthritis (in every joint shown in the data compared with men.)(1) • The prevalence of osteoarthritis is low for both men <u>and</u> women under the age of 30.(1) • The prevalence of osteoarthritis increases {sharply/a lot/more} for women after 40 years old (especially for joints of the hands).(1) • The prevalence of osteoarthritis increases {sharply/a lot/more} for men {after 50 years old/after than women} (especially for joints of the hands)(1) • Hand joint arthritis is higher than knee which is higher than hip (for both) (1) • Males decrease between 70 and 80 years old (1) whereas only the hands decrease for women (1)	3				3		
		(ii)	puts strain on joints (which increases the risk of developing osteoarthritis)	1			1			
	(b)	(i)	Synovial / hinge(joint)	1		1				
		(ii)	Any 2 × (1) from: • The cartilage is damaged (around the bones of the knee) so there is less cushioning (around the joint causing pain).(1) • There is a decrease of synovial fluid which causes less lubrication (around the joint causing pain). • The synovial membrane is inflamed (causing pain).(1) Accept rubbing of bones/friction as an explanation of first or second point once only	2		2				
		(iii)	Any 2 × (1) from: Pain killers (1) Surgery /knee replacement (1) Physiotherapy (1) Steroid <u>injections</u> (1) Do not accept surgery / operation if context is incorrect	2			2			
Total Question 9				9	0	3	3	3	0	0

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
10	(a)		 alveolus/alveoli bronchus/bronchi diaphragm 3 correct (2) 2 correct (1)	2		2				
	(b)		Less gas in / out (1) Increased ventilation rate (1) accept increased breathing <u>rate</u>	2		2				
	(c)		Any 3 × (1) from: • Social/ Scientific value of research (1) • Care and protection of research participants (1) • Confidentiality (1) • Informed consent (1) • Working with vulnerable individuals (1) Accept other points from ethical evaluation questionnaire.	3						3
Total Question 10				7	0	4	0	0	0	3

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
11	(a)		2000 surveyed. 29 % sought medical help 580 sought medical help (1) 74 % prescribed medication 429.2/430 people prescribed medication for depression (1) 430 with no workings (1)	2				2		
	(b)		Any 2 × (1) from: • Inherited/ genetics/ family history of mental illness.(1) • Grief (1) • Stress/ difficult life circumstances e.g. unemployment(1) • Trauma (1) • Medications (1) • Hormones (1) • Abuse of drugs/ alcohol (1) • sexuality (1)	2			2			
	(c)		The cost does not consider money lost by employers when someone with depression fails to attend work/ does not consider people who have not been diagnosed yet though are still suffering from mental health illness/people who have not sought help end up with worse issues (e.g. alcoholism) due to not seeking medical	1			1			
	(d)	(i)	All <u>regions</u> are affected by the same risk factors for mental illness(1) Such as workload, housing, cost of living, unemployment AVP (1)	2			2			
		(ii)	Any 2 × (1) from: reduce stress (1) seek (medical) help for feelings (1) reduce alcohol/ drug use (1) exercise more (1) medication (1)	2			2			
Total Question 11				9	0	0	7	2	0	0

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3															
12	(a)		<table><tr><th>Physiological Test</th><th>Principle of Test</th></tr><tr><td rowspan="2">Electrocardiogram (ECG)</td><td>Recording of electrical signals (and production of a trace of the heart)</td></tr><tr><td>Do not accept: heart beat or heart rate</td></tr><tr><td>Reading chart and lenses</td><td>(Tests for difficulty in) vision. Do not accept: tests the eye</td></tr><tr><td>Otoscope</td><td>Used to examine the outer ear (to ear drum) /Assess for inflammation, infection and abnormalities in the outer ear.</td></tr><tr><td>Spirometer</td><td>Detailed lung function- volume of air exhaled in one forced breath- shows if problems are obstructive/ restrictive.</td></tr><tr><td>Gastroscope</td><td>look inside the stomach / small intestine.</td></tr><tr><td>Urodynamic tests</td><td>Assess how well the bladder / sphincters /urethra (are storing urine) / assess function of urinary system</td></tr></table>	Physiological Test	Principle of Test	Electrocardiogram (ECG)	Recording of electrical signals (and production of a trace of the heart)	Do not accept: heart beat or heart rate	Reading chart and lenses	(Tests for difficulty in) vision. Do not accept: tests the eye	Otoscope	Used to examine the outer ear (to ear drum) /Assess for inflammation, infection and abnormalities in the outer ear.	Spirometer	Detailed lung function- volume of air exhaled in one forced breath- shows if problems are obstructive/ restrictive.	Gastroscope	look inside the stomach / small intestine.	Urodynamic tests	Assess how well the bladder / sphincters /urethra (are storing urine) / assess function of urinary system	6					6	
Physiological Test	Principle of Test																								
Electrocardiogram (ECG)	Recording of electrical signals (and production of a trace of the heart)																								
	Do not accept: heart beat or heart rate																								
Reading chart and lenses	(Tests for difficulty in) vision. Do not accept: tests the eye																								
Otoscope	Used to examine the outer ear (to ear drum) /Assess for inflammation, infection and abnormalities in the outer ear.																								
Spirometer	Detailed lung function- volume of air exhaled in one forced breath- shows if problems are obstructive/ restrictive.																								
Gastroscope	look inside the stomach / small intestine.																								
Urodynamic tests	Assess how well the bladder / sphincters /urethra (are storing urine) / assess function of urinary system																								
	(b)	(i)	Any 2 × (1) from: • age(1) • height (1) • gender (1) • general health(1) • pregnancy(1) • medication(1) • fear/stress(1) • caffeine(1) • activity (1) • AVP	2					2																

Question No.			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
		(ii)	Any 3 × (1) from: • Pressure inside aorta is the highest. (1) • As blood moves through to the arteries pressure drops (1) • blood pressure is at its lowest in the veins. (1) • Due to cross sectional area increasing in veins compared to arteries so decreasing pressure.(1) • Friction on walls decreases pressure (1)	3						
Total Question 12				11		3			8	

UNIT 1 – HUMAN HEALTH AND DISEASE

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	TOTAL MARK	LO1	LO2	LO3	LO4	Unit 2	Unit 3
Section A	25		5	8	6		6
6.	8		8				
7.	7	7					
8.	14	14					
9.	9		3	3	3		
10.	7		4				3
11.	9			7	2		
12.	11		3			8	
TOTAL	90	21	23	18	11	8	9