



LEVEL 3 MARKING SCHEME

SUMMER 2022

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

INTRODUCTION

This marking scheme was used by WJEC for the 2022 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

UNIT 1 – HUMAN HEALTH AND DISEASE

SUMMER 2022 MARK SCHEME

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

SECTION A

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
1.			Any 3 for 1 mark lack of appetite weight loss fever night sweats extreme tiredness or fatigue a persistent cough that lasts more than three weeks and usually brings up phlegm, which may be bloody. breathlessness that gradually gets worse persistently swollen glands abdominal pain pain and loss of movement in an affected bone or joint confusion a persistent headache fits	1			1			
2.			{person with TB / infected person} coughs or sneezes. (1) and someone else inhales (the expelled) droplets (which contain TB bacteria.) (1)	2			2			
3.			Any 3 × (1) from: B lymphocytes (have receptors) (1) detect/recognise specific antigens (1) production of plasma cells/memory cells (1) Memory cells remain ready to divide if same antigen is encountered again (1) Plasma cells produce antibodies (1) form an antigen-antibody complex (1) inactivates antigen / clumping and phagocyte action (1)	3		3				

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
4.			Any 2 × (1) from: endoscope is a tube with a light and camera (1) inserted through (natural opening e.g.) mouth and down throat / inserted through surgical cut (1) Images are relayed to a {TV / screen} (so clinician can see what is happening inside) (1)	2					2	
5.	(a)		the bacteria infect the body but do not cause any symptoms (1) the infection may cause symptoms {within weeks, months or years / straight away} (1)	2			2			
	(b)		can cause liver damage in older adults accept: liver failure	1			1			
6.	(a)		<u>Higher</u> incidence of TB in most deprived areas / <u>lower</u> incidence in least deprived / or comparison	1						1
	(b)		The most deprived being in potentially less hygienic / overcrowding/ worse access to health care / AVP Allow converse	1						1

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
7.			Any 2 × (1) from: Increased number of non-UK workers with TB travelling to Wales / increased numbers travelling to UK from other countries (1) outbreak in work environment (where transmission is potentially high due to high population) (1) lack of vaccination (1) People with latent TB finally exhibiting symptoms and active TB (1) increases quickly in high population {areas/overcrowded housing} (1) Increased testing (1)	2				2		
8.	(a)		Line graph (1) Axes with correct scale (including value at origin) and units (1) Plots – allow 2 errors (tolerance < 1 small square) (1) Two suitable, labelled lines, drawn point to point from centres of points (1) Bar graph- 2 marks max Axes and units (1) identification of bars (1)	4						4
	(b)		Isoniazid - resistance higher / increases (1) Rifampicin- lower resistance (than isoniazid) and remains low (but with slight increase in last year) (1)	2						2

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
	(c)		Use a wider range of antibiotics/ stop using antibiotics that are showing resistance/ vaccinate more people/ screen more people for disease/ use alternative medication / encourage patients to complete their courses of antibiotics Allow: improve hygiene in crowded places/ screen foreign nationals for TB	1			1			
Total Section A				22	0	3	7	2	2	8

SECTION B

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3															
9.	(a)	(i)	Peak flow meter	1					1																
		(ii)	Any 3 × (1) from: Patients stand / sit upright (1) Inhale (1) Mouth tightly fitted around mouthpiece (1) Pointer at 0 (1) {Exhale/breathe out} as hard and fast as possible (1)	3					3																
		(iii)	<table><tr><th>Name</th><th>Height (m)</th><th>Reading 1</th><th>Reading 2</th><th>Final Value</th></tr><tr><td>Pete</td><td>1.80</td><td>600</td><td>650</td><td>650</td></tr><tr><td>Eurig</td><td>1.70</td><td>500</td><td>550</td><td>550</td></tr></table>	Name	Height (m)	Reading 1	Reading 2	Final Value	Pete	1.80	600	650	650	Eurig	1.70	500	550	550	2				2		
Name	Height (m)	Reading 1	Reading 2	Final Value																					
Pete	1.80	600	650	650																					
Eurig	1.70	500	550	550																					
		(iv)	Both for 1 mark Pete 20 years old and Eurig 40 years old Allow ecf	1				1																	
	(b)		Nose clip (1) Forced breath (1) Measured on trace (1)	3					3																
Total Question 9				10	0	0	0	3	7	0															

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
10.	(a)		Proteins/polypeptides	1		1				
	(b)		Beta cells (1) Pancreas/ islets of Langerhans (1)	2		2				
	(c)		Insulin max 3 marks Any 3 × (1) from: Glycogenesis/ Converts excess glucose into glycogen (1) Released (by pancreas) into blood stream (1) Glycogen stored in liver (1) Blood glucose level decreases (1) Negative feedback (1) Glucagon max 2 marks Any 2 × (1) from: Increases blood glucose level (1) Glycogenolysis / conversion of glycogen back to glucose (1) Negative feedback (1) (only referenced once) Correct spelling needed for glycogen and glucagon	5		5				
	(d)	(i)	$47 \times 38 = 1786 \text{ kJ}$ (1) $1786/12570 \times 100 = 14.2\% / 14\%$ (1)	2				2		

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
		(ii)	1 mark change & 1 mark explanation reduce intake of sugary/ fatty foods/carbohydrates (1) to reduce risk of becoming obese/ type 2 diabetes/ heart disease (1) Increase intensity of exercise/physical activity (1) reduce risk of becoming obese/ improve cardiovascular health/ use up excess glucose to reduce risk of type 2 diabetes (1) Reduce alcohol consumption (1) reduce risk of developing cardiovascular disease/ liver problems (1) Lack of protein/eat more protein (1) valid explanation of risk of lack of protein in diet (1) Reduce salt intake (1) reduce risk of stroke/hypertension (1)	4			4			
Total Question 10				14	0	8	4	2	0	0

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3															
11.	(a)		1 mark per box. <table><tr><th>Statement</th><th>Biological Molecule</th></tr><tr><td>composed of three fatty acids and a glycerol molecule</td><td>C</td></tr><tr><td>a polysaccharide</td><td>E</td></tr><tr><td>found in α and β forms</td><td>D</td></tr><tr><td>examples include oestrogen and testosterone.</td><td>B</td></tr><tr><td>a constituent part of RNA.</td><td>A</td></tr><tr><td>two of these molecules join to form maltose.</td><td>D</td></tr></table>	Statement	Biological Molecule	composed of three fatty acids and a glycerol molecule	C	a polysaccharide	E	found in α and β forms	D	examples include oestrogen and testosterone.	B	a constituent part of RNA.	A	two of these molecules join to form maltose.	D	6	6						
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two of these molecules join to form maltose.	D																								
	(b)		1 mark per gap. Carbohydrate monomers form glycosidic (1) bonds when they join during condensation (1) reactions. During these reactions a molecule of water (1) is removed. The bond formed between two amino acids is a peptide (1) bond. In order to break this bond a hydrolysis (1) reaction must take place. Once joined, two amino acids form a dipeptide (1)	6	6																				
	(c)		Saturated fatty acids have only single carbon-carbon bonds. (1) Mono- unsaturated fatty acids have one carbon-to carbon double bond/ poly-unsaturated fatty acids contain two or more carbon-to carbon double bonds/ unsaturated fatty acids contain at least one carbon-carbon double bond (1)	2	2																				
Total Question 11				14	14	0	0	0	0	0															

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
12.	(a)		(Chest/arm) pain / exhaustion / weakness / vomiting / restlessness / dizziness / shortness of breath	1			1			
	(b)		35 % of £ 669 000 000 / $0.35 \times 669\,000\,000$ (1) = £ 234 150 000 (1) = £ 234 000 000/ £ 234 million (1)	3				3		
	(c)		Men naturally at higher risk than women/ potentially eating food higher in fat/ More men obese than women / female hormones offer some protection against angina/ men carry out more physically demanding jobs that puts stress on heart/ More men smoke than women /AVP	1			1			
	(d)		Test = ECG/ Stress ECG (1) Result = ST lower on trace/ irregular heart rate / description of arrhythmia (1)	2					2	
	(e)		Any 4 × (1) from: Plaque builds (up on artery wall) (1) Resulting in restricted blood flow (1) to heart muscle (1) forms clot / blood clot blocks artery (1) Blood is unable to pass through artery/ blood clot bursts (1) Heart muscle starved of oxygen (1)	4		4				
Total Question 12				11	0	4	2	3	2	0

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
13.	(a)		Communicable: poor hygiene/overcrowding/ poor health care/ lack of vaccination Nutritional: (unable to afford good quality food so) suffer malnutrition/ other deficiency diseases	2			2			
	(b)		Unable to afford medication that prevents HIV {spreading/ treatment} / not enough provision of condoms / mother giving birth to babies with HIV / lack of hygienic disposal of bodies or other items contaminated with HIV / lack of education about HIV	1			1			
	(c)		Any 2 × (1) from: Less regulations on drink driving (1) People cannot afford to maintain their cars properly so may be unsafe on the roads (1) Health care if in an accident may not be good enough/poor response times (1) Lack of driving training/licensing / regulations (1) Poor road conditions (1) Lack of safety equipment (1) AVP	2			2			
Total Question 13				5	0	0	5	0	0	0

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3
14.	(a)	(i)	nucleotide	1	1					
		(ii)	phosphate	1	1					
		(iii)	RNA- ribose (1) DNA- deoxyribose (1)	2	2					
		(iv)	4 correct 2 marks 2/3 correct 1 mark 0/1 correct 0 marks Adenine, Uracil, Cytosine, Guanine Not AUCG	2	2					
	(b)		Any 3 × (1) from: A-T and C-G pairing (1) Alternate sugar phosphate group backbone / phosphodiester bonds between sugar and phosphate (1) Two chains joined by base pairs (1) Hydrogen bonding (1) Forms a double helix (1) Strands are antiparallel (1)	3	3					
Total Question 14				9	9	0	0	0	0	0

Question			Answer	Marks	LO1	LO2	LO3	LO4	Unit 2	Unit 3												
15.	(a)	(i)	Ileum/ small intestine/ intestine (not large intestine)	1		1																
		(ii)	Absorption	1		1																
	(b)		1 mark per box <table><tr><th>Letter</th><th>Name</th><th>Function</th></tr><tr><td>B</td><td>Microvilli</td><td>Increases surface area</td></tr><tr><td>C</td><td>Mucosa</td><td>Absorption and secretions/ contains connective tissue</td></tr><tr><td>D</td><td>Submucosa</td><td>Contains vessels to transport products of digestion</td></tr></table>	Letter	Name	Function	B	Microvilli	Increases surface area	C	Mucosa	Absorption and secretions/ contains connective tissue	D	Submucosa	Contains vessels to transport products of digestion	3		3				
Letter	Name	Function																				
B	Microvilli	Increases surface area																				
C	Mucosa	Absorption and secretions/ contains connective tissue																				
D	Submucosa	Contains vessels to transport products of digestion																				
Total Question 15				5	0	5	0	0	0	0												

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	22	0	3	7	2	2	8
9.	10	0	0	0	3	7	0
10.	14	0	8	4	2	0	0
11.	14	14	0	0	0	0	0
12.	11	0	4	2	3	2	0
13.	5	0	0	5	0	0	0
14.	9	9	0	0	0	0	0
15.	5	0	5	0	0	0	0
TOTAL	90	23	20	18	10	11	8
TARGET	90	18-23	18-23	18-23	10-15	8-12	8-12