



LEVEL 3 MARKING SCHEME

SUMMER 2023

**LEVEL 3 DIPLOMA/CERTIFICATE IN MEDICAL
SCIENCE - UNIT 6
4463U60-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2023 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 6 – MEDICAL CASE STUDY

SUMMER 2023 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

Case study 1			Answer	Marks	LO1	LO2	LO3	LO4	LO5
1.	(a)	(i)	more than one {polypeptide/protein} chain/ more than one {polypeptide/protein} structure accept more than one tertiary structure	1	1				
		(ii)	Any two for one mark from; Peptide Hydrogen Disulfide Ionic Van der Waals	1	1				
	(b)		Any two × (1) from: Causes blood vessels to leak/more permeable (1) Develop blood vessels /grows new blood vessels (1) which damage the retina (1)	2	2				
2.	(a)		Dilates the pupils (1) Makes observation of {retina/structure of inner eye} easier (1) Accept: eye can be examined as pupil enlarges Reject: back of eye if context is incorrect	2				2	
	(b)		Pressures (in the eye) Reject: pressure in blood vessels of eye	1		1			
	(c)		A dye is <u>injected</u> (into the arm) (1) (dye) moves to the vessels of the eye / (dye) moves in the bloodstream to the eye (1) measure / record /observe (the blood flow through the eye) (1) using a retinal camera / take photographs / using X-rays (1)	4		4			

Case study 1			Answer	Marks	LO1	LO2	LO3	LO4	LO5
3.	(a)	(i)	Any 2 × (1) from: Anti-VEGF/reduces the effect of VEGF/ binds to VEGF /antibody–antigen complex is formed (1) fewer new blood vessels formed / stops formation of <u>leaky</u> blood vessels (1) Reduces permeability / leakiness of blood vessels (1)	2				2	
		(ii)	Act directly / immediate effect (on blood vessels in eye) Accept: A drug can only be administered by medical practitioner / less risk of patient error Reject: first pass effect / drug being metabolized	1				1	
	(b)		Light / laser is used (1) This stimulates the action of {photo-sensitive drug / light- sensitive drug / verteporfin} (1) Seals leaky blood vessels (1)	3				3	
4.	(a)		Total AMD = (516 000 + 240 000) = 756 000 (1) Total sight threatening = 2 481 000 (1) % AMD = $756\,000 / 2\,481\,000 \times 100 = 30.47$ (1) 30 / 30.5 / 30.47 % seen on answer line - 3 marks 30.4% seen on answer line – 2 marks	3			3		
	(b)		101 000 (1) / $415\,000 \times 100$ = 24.337 / 24.34 / 24.3 / 24 % (1) Correct answer only – 2 marks	2			2		
	(c)		Population is ageing / {monitoring of patients/detection} has improved / increase in CVD / increase in screen use / sustained exposure to blue light Reject: increase in smoking	1			1		

Case study 1			Answer	Marks	LO1	LO2	LO3	LO4	LO5
5.			Ranibizumab: $551 \times 8 = \text{£}4\,408$ (1) Saving = $\text{£}4\,240$ (1) Correct answer only – 2 marks	2				2	
Total Case Study 1				25	4	5	6	10	0

Case study 2			Answer	Marks	LO1	LO2	LO3	LO4	LO5												
6.	(a)		Purine	1	1																
	(b)		Meat extracts /cheese / egg / meat / fish/ nuts /protein-rich food / accept any reasonable answer	1	1																
7.			<table><tr><td>Substance tested</td><td>Reagent/ procedure</td><td>Observation</td></tr><tr><td>Glucose</td><td>Heated/boiled with Benedict's solution</td><td>Blue →green/ amber /yellow / orange / (brick) red (1)</td></tr><tr><td>Protein</td><td>Biuret (1)</td><td>Blue → violet</td></tr><tr><td>Sodium ions</td><td>Flame test</td><td>Yellow /orange (1) Flame</td></tr></table>	Substance tested	Reagent/ procedure	Observation	Glucose	Heated/boiled with Benedict's solution	Blue →green/ amber /yellow / orange / (brick) red (1)	Protein	Biuret (1)	Blue → violet	Sodium ions	Flame test	Yellow /orange (1) Flame	3					3
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8.	(a)	(i)	490 cm ³	1		1															
		(ii)	490 (ecf)/70 (1) 7ml/cmH ₂ O (1) Correct answer on answer line – (2)	2		2															
	(b)		Any 2 × (1) from: Time taken to produce a urinary stream/ time taken to start urinating (1) <u>Volume</u> of urine produced (1) Ability to stop the urine flow (mid-stream) (1)	2		2															
9.			Relaxes the muscles around the {bladder/ureter/urethra} (1) Makes it easier to urinate / allow stones to pass (1)	2				2													

Case study 2			Answer	Marks	LO1	LO2	LO3	LO4	LO5
10.			Any 3 × (1) from: A: {Initially/below 40} prevalence is low (in both males and females) (1) B: Higher prevalence with increasing age (in both males and females) (1) C: Higher prevalence in males (1) D: Increasingly higher in older males (1)	3			3		

Case study 2			Answer	Marks	LO1	LO2	LO3	LO4	LO5
11.			Any 10 × (1) from: A: Osmoregulation/homeostasis B: Negative feedback C: (Blood) concentration detected by hypothalamus D: Osmoreceptors E: ADH F: Released from (posterior lobe of) pituitary gland G: Transported in blood H: To kidneys I: (cells of) distal convoluted tubules/collecting ducts J: More permeable (to water) K: Water reabsorbed /out of tubules/into tissues/into blood L: By osmosis M: Urine more concentrated/low <u>volume</u> of urine N and O AVP (max 2) e.g. ADH made in hypothalamus Role of aquaporins ORA	10	10				
Total case study 2				25	12	5	3	2	3

Case study 3			Answer	Marks	LO1	LO2	LO3	LO4	LO5
12.	(a)		Through cuts / mouth / eyes / by drinking contaminated water	1				1	
	(b)		A E C D B One correct (1) 2/3 correct (2)	2					2
	(c)		(When treated with alcohol) the {outer layer/ outer membrane / lipopolysaccharide} is lost (1) Safranin stains {inner / peptidoglycan} layer (red) (1)	2					2
	(d)		Any two × (1) from: Size (1) Shape / flagellum / cilia (1) toxin production (1) antigen features (1) colour of colonies (1) shape of colonies (1) specific growth media (1)	2					2
13.	(a)		Cheap (to purchase) / Lower cost to the NHS (1) Readily available/ easy access to medicine/doesn't need to be prescribed / Less visits to the GP / quicker than going to the GP (1)	2				2	
	(b)		Treating symptoms rather than cause / not treating the infection / incorrect selection of 'right' drug / not as effective as a prescribed drug / not specific	1				1	

Case study 3			Answer	Marks	LO1	LO2	LO3	LO4	LO5
14.	(a)		antibody production takes at least 6 days/ increases after 6 days (1) ELISA to detect antibodies (1)	2					2
	(b)		Confirmation of <u>bacterial</u> infection / the infection may not be caused by bacteria (1) Stops over-prescription/resistance (1) Reject: immune	2				2	
	(c)		Any 4 × (1) from: A: Clonal selection / antigens (on bacterium) bind to {antibodies/receptors} on B {lymphocyte/cell} (1) B: Clonal expansion /B {lymphocytes/cells} {divide / increase in numbers} (by mitosis) (1) C: Activation / memory cells and plasma cells (1) D: {Plasma cells/(B) lymphocytes} secrete antibodies (1) E: Form antibody-antigen complexes (1) F: Agglutination/lysis of pathogen/ {engulfed /destroyed} by phagocytes (1) G: Memory cells remain (in blood) (1)	4	4				
15.	(a)		Doxycycline inhibits protein synthesis (1) by binding to (70S) ribosome/so they cannot replicate/stops bacteria multiplying (1) Penicillin Any 2 × (1): inhibits the formation of (peptidoglycan) cell walls (1) prevents cross linking protein/causes holes in wall (1) bacteria burst (1)	4				4	

Case study 3			Answer	Marks	LO1	LO2	LO3	LO4	LO5
	(b)		Patients may be allergic to penicillin/side effects (1)	1				1	
16.			<u>More</u> Leptospira/bacteria in warmer (Jamaican) water (1) More visitors take part in water activities (increased risk of infection) (1) ORA	2			2		
Total Case Study 3				25	4	0	2	11	8

SUMMARY OF MARKS ALLOCATED TO LEARNING OBJECTIVES

Question	TOTAL MARK	LO1	LO2	LO3	LO4	LO5
Total Case Study 1	25	4	5	6	10	0
Total case study 2	25	12	5	3	2	3
Total Case Study 3	25	4	0	2	11	8
TOTAL	75	20-22 (20)	9-12 (10)	8-12 (11)	20-25 (23)	8-12 (11)