WJEC (Wales) Biology GCSE
Topic 2.8 Disease, Defence and Treatment
Questions by Topic - Mark Scheme

1.

Question		Marking details	Marks Available
(b)	(i)	Protein (coat);	1
	(ii)	By multiplying inside a host cell;	1
		Question 1 total	**[7]**

2.

Question			Marking details	Marks Available
(a)	(i)		Description must include DNA / RNA/ genetic material/ genes/ nucleic acid; and protein {coat/ outside};	2
	(ii)		III;	1

3.

Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
(a)	i		1	There were 800 tonnes 2001 and 1100 tonnes in 2011/ there is an increase from 2001 to 2011;			
	ii		2	(1 100 – 800)/10; 30 [tonnes per year]; Correct answer = 2 marks Incorrect answer but correct method = 1 mark			
	iii	I	1	break down plastic;		Feeding on plastic/ destroys plastic	
		II	1	pathogen / cause disease;		Releasing harmful chemicals	

4.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(a)	(i)		{Organism/ living thing/ micro-organism/ microbe} which causes disease Reject bacteria/ virus	1			1		
		(ii)		any **two** (x1) from: • contact/ touch • aerosol/ sneezing/ coughing/ inhaling • body fluids/ named body fluid/sexually transmitted • contaminated water • insects/ named insect e.g. mosquito • contaminated food Reject air unqualified	2			2		
	(b)	(i)		penicillin allow other	1			1		
		(ii)		bacteria become resistant to antibiotics	1			1		
	(c)	(i)	I	June 15 – July 15		1		1	1	
			II	(numbers are) increasing / (numbers are) close to the unsafe level(1) unsafe level likely to be passed before end of June/next sample/ within the month (1)			2	2		
		(ii)	I	species A increases **and** decreases (1) species B increases (1)		2		2		

5.

Question			Marking details	Marks Available
	(b)	(i)	Smaller;	1
		(ii)	Cannot reproduce alone/needs a (living) cell for reproduction; Accept – no cell membrane/no cytoplasm NOT needs a cell to survive	1

6.

Question		Marking details	Marks Available
(a)	(i)	Lymphocyte/ B cells;	1
	(ii)	{Lymphocyte/cell} has {reproduced/cloned/produced/ divided into} (identical) copies; Many times;	2
	(iii)	{Lots of/more}antibodies produced/ memory cells produced/ so there will be a rapid response;	1
(b)		Different antigens; So different antibodies needed;	2
(d)		Prevent {blood loss/bleeding}; Prevents {pathogens/microbes} entering/ prevents bacterial infection;	2

7.

Question		Marking details	Marks Available
(a)	(i)	C	
	(ii)	I 5 000; II *(E coli)* (very) common in humans/ causes serious {illness/ death};	2
(b)	(i)	Resistant/ resistance; NOT immune	1
	(ii)	Over prescription/ overuse/ giving too many antibiotics/ doctors transferring from patient to patient;	1
(c)		(Antibiotics) do not kill viruses/ only kill bacteria/ to kill an antiviral drug; Accept destroy for kill NOT do not effect/ do not work on bacteria	1

8.

Mark	Answer
6 QWC	*Indicative content:* • platelets form a blood clot • which seals the wound/ stops the bleeding • to prevent entry of microbes/bacteria • white blood cells/phagocytes {ingest/engulf} microbes/bacteria NOT destroy • white blood cells/lymphocytes produce antibodies* • which inactivate certain bacteria/microbes/viruses • white blood cells/lymphocytes produce antitoxins* • which inactivate/counteract toxins released by bacteria/microbes *Needed for top band **5-6 marks** The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar. **3-4 marks** The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar. **1-2 marks** The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar. **0 marks** The candidate does not make any attempt or give a relevant answer worthy of credit.

9.

Question	Marking details	Marks Available

(a) (i)

name of cell	function
given	carry oxygen;
lymphocyte; NOT white blood cell	given
given	• Ingest/ take in/ digest/ engulf; NOT eat/ destroy • bacteria/microorganisms/ pathogen/ microbes; NOT disease
given	(blood) clotting;

4

10.

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
(a) (i)	Drawing with Cell with inclusion(to represent nucleus) (1)Name – white blood cell/ phagocyte/ lymphocyte(1) Function – {defence/ protection} against {disease/ pathogen/ infection/ bacteria/ viruses}/ destroy bacteria/ provide immunity/ produce antibodies/ produce antitoxins/ engulf bacteria (1) NOT fight	2	1		3		
(iii)	9 (cm^3) = 2 marks must use units if answer not written on answer line If incorrect award 1 mark for: 20 x 45/100 or 20 x 0.45		2		2	2	

11.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)					
ii	2	50 – 8 = 42; 42/50 x 100 = 84%; Correct answer = 2 marks			
iii	1	{Higher number of deaths per 100 000/ higher percentage die} (in Africa);	ORA		
(b)	4	Vaccine contains the antigen; Causes memory cells to be produced; For future invasions of bacteria; by {rapid production/ production of large numbers} of antibodies;			
(c)	1	Bacteria develop resistance to antibiotics/ fewer people vaccinated;		overuse of antibiotics/ not completing course of antibiotics	Bacteria resistant to vaccine/ Bacteria are immune to antibiotics

12.

Question		Marking details	Marks Available
(a)	(i)	0-1 years;	1
	(ii)	memory cells; antigens; trigger {white blood cells/ lymphocytes}; to form clones/ reproduce/ multiply / undergo mitosis; {to increase production of/ more} antibodies/ produce antibodies more quickly;	5
(b)	(i)	(Edward) Jenner (correct spelling);	1
	(ii)	Flu virus mutates rapidly/ antigens keep changing/ protein coat keeps changing; NOT evolve	1

13.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)			Any three (x1) from: • lymphocytes divide to produce {clones of cells/ large numbers of {lymphocytes/ plasma cells}} (1) • the production of these cells is a slow response (1) • some of these produce antibodies which act against the antigen (1) Reject kill / fight / attack antigens Accept destroy antigens • (other lymphocytes) produce memory cells (1) • memory cells react rapidly against the antigen on next contact with body (1)	3			3		

14.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)	(i)		{kill/prevent growth} of bacteria (in wounds)	1			1		
	(ii)		virus	1			1		
	(iii)		possible side effects/ unknown long term effects	1			1		
(b)			Any one (x1) from pH + {add/use} acid/alkali reservoir oxygen + sterile air in temperature + water jacket/ cold water in		1		1		1
(c)	(i)		0.5 = 2 marks 15/30 or (23-8)/30 = 1 mark		2		2	2	
	(ii)	I	Accept any figure between 96-100 hours (1) Mass of penicillin is at its {maximum/ remains constant/ levels off}/ no more penicillin is being produced/ penicillin production has stopped/ OWTTE (1)		1	1	2		
(d)			Needs to start at same point, end same level but to left of existing curve for Penicillium			1	1		
			Question 14 total	**3**	**4**	**2**	**9**	**2**	**1**

15.

Question		Marking details	Marks Available
(a)		Conclusion 1: No bacteria next to [Penicillium/fungus}/ clear area {by/ around} fungus/ bacteria only grow around edges; Conclusion 2: Effect decreases with distance from source/ effect decreases towards the edges/ clear area is circular;	2
(b)	(i)	antibiotic;	1
	(ii)	Overuse/ Over prescription/ giving too many antibiotics; become resistant; NOT immune/ bacteria adapt (unqualified)	2
(c)		any sensible aseptic method; • wash hands (a lot/regularly…..) • use of sterilising fluids/cloths • single use instruments/materials • use gloves • antibacterial gels • clean hospitals thoroughly • description of nurses uniform remaining in hospital NOT aseptic techniques unqualified	1
		Question 15 Total	**[6]**

16.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)	(ii)		antigens on cells of donor kidneys (1) white blood cells produce antibodies (specific to antigens) (1) that {destroy/ act against} the {antigens/cells} (1) Reject {kill/ fight/ attack} antigens		3		3		
(b)	(i)		myeloma/ tumour cells/cancerous white cells/ cancer cells	1			1		
	(ii)		lymphocytes	1			1		
	(iii)		hybridoma	1			1		
	(iv)	B: C:	(Injected) antigen {stimulates/ causes} {immune response/ lymphocyte production/ cloning of lymphocytes} (1) {cells B/ lymphocytes} and {cells A/ myeloma} are {fused/ combine/ merge} together (1)		2		2		
(c)			Any two (x1) from: • diagnosis of [disease/chlamydia/HIV] • tissue typing for transplants • monitoring of the spread of malaria • supporting chemotherapy for cancers • pregnancy testing	2			2		

17.

Question		Marking details	Marks Available
(a)	(i)	Excretion ; NOT filtration	1
(b)	(i)	28 **and** 39;	1
	(ii)	4 bars each correct height with label – 3 marks 3bars each correct height with label – 2 marks 2 bars each correct height with label – 1 mark ½ small square tolerance in plotting height *Correct order (either way)* Kidney (family donor) Kidney (non-family donor) Lung Heart Liver Allow all bars correct height and **in sequence** but no labels = 1 mark	3
	(iii)	They have been done for different lengths of time/ some have been done for longer (time than others);	1
	(iv)	Less likely to be rejected; NOT fail Because same/ similar/compatible tissue type; NOT same cells	2
		Question 17 Total	**[8]**

18.

Question	Marking details (QER)	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
(a)	***Indicative content:*** • Working close to Bunsen flame/disinfect bench • Label the base of the petri dish(es) to indicate antibiotics • Flame forceps (then cool) • Pick up each antibiotic disc in turn and place on agar surface • Minimum lifting of lid /Seal dish with tape • Incubate • {for 2-3 days/ at 20 – 25 °C} • (Observe results and) measure diameter of clear area around each disc • compare the results for the antibiotic **5-6 marks** At least seven correct points from indicative content *There is a sustained line of reasoning which is coherent, relevant, supported by evidence and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.* **3-4 marks** At least four correct points from indicative content *There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.*	6			6		6
	1-2 mark Any one correct point from indicative content *There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.* **0 marks:** *No attempt made or no response worthy of credit.*						
(b)	Improved hygiene practices/ named example e.g. {hand washing/ use of gels}/ thorough cleaning of hospital wards/ {isolation/ screening} of infected patients (1) Restraint in use of antibiotics {in hospitals/by doctors}/ owtte (1) Accept restraint in use of antibiotics in agriculture/ farming	2			2		
	Question 18 Total	**8**	**0**	**0**	**8**	**0**	**6**