

Question		Answers	Marks	Additional Guidance
1	(a)	(i) mycelium ;	[1]	
		(ii) hypha ;	[1]	
	(b)	hyphae, secrete / release ; enzymes ; amylase ; breaks down starch to, maltose / glucose ; protease ; breaks down protein to, peptides / amino acids ; products absorbed ; by diffusion / active uptake ;	[max 4]	ignore produce accept soluble nutrients if no digestion given

1	(c)	(i) antibiotics diffuse through the agar ; (some) kill / stop reproduction of, bacteria ref to not all antibiotics being effective	[max 2]	
		(ii) bacteria grew around the discs ; bacteria are <u>resistant</u> to antibiotics 1 and 5 ; any explanation of resistance ;	[max 2]	R immune bacteria break down antibiotic
		(iii) kill all the bacteria ; some still present even after person feels better ; prevents bacteria becoming resistant ; prevents selection of resistant strain ;	[max 2]	accept description of selection even if the term is not used
			[Total: 12]	

Question	Answers	Marks	Guidance
2 (a)	drug / medicine(AW) / chemical / substance ; produced by microorganisms ; A ref to idea of synthetic analogues kills / stops, growth of, bacteria / other microbes ;	[max 2]	medicine / AW e.g. '(antibiotic) used to treat infection' is worth a mark A examples e.g. penicillin qualified 'penicillin is an antibiotic that kills bacteria/AW' would gain 2 marks penicillin alone cannot score R viruses
(b) (i)	(most) were killed by the antibiotic ; ora	[1]	
(ii)	(only) antibiotic-resistant bacteria transferred from B / (only) resistant bacteria in C / fewer resistant bacteria in B / non-resistant bacteria were killed in B ;	[1]	
(c)	resistant bacteria, survive / not killed / are selected for / selection pressure ; eventually, all / many, become resistant ; AVP ; e.g. any consequence of overuse / antibiotic no longer effective ;	[max 2]	R references to immunity as alternative to resistance
(d)	X-rays caused mutations ; change in DNA ; ref to, gene / allele ; mutation causes antibiotic resistance ;	[max 3]	ALLOW radiation
(e)	assume answer is about bacteria unless told otherwise, accept ora / AVP for viruses e.g. capsid bacteria have cells ; cell wall ; cell membrane ; cytoplasm ; ribosome(s) ; flagellum ; capsule ; AVP ;	[max 2]	R nucleus in bacteria IGNORE composition of cell wall

Question	Answers	Marks	Guidance
2 (f)	HIV infects <u>lymphocytes</u> ; T helper (lymphocytes / cells) ; fewer antibodies produced ; infected cells not killed (by immune system) ; phagocytes less effective ; increased susceptibility to / longer recovery time for, (infectious) diseases / named disease (TB) ; cancers ; <u>opportunistic</u> diseases ; ref to AIDS ;	[max 4]	
		[Total: 15]	

Question	Answers	Marks	Additional Guidance										
3 (a)	muscles / surrounding tissues, contract / squeeze, vessels ; valves, prevent backflow / ensure one way flow ; ref. to breathing (lowering pressure in chest) ;	[2]											
(b)	<table border="1"> <tr> <td>1</td> <td>fat / fatty acids (and glycerol), absorbed (in ileum) ;</td> </tr> <tr> <td>2</td> <td>ref. to making fat water soluble ;</td> </tr> <tr> <td>3</td> <td>fat enters lacteals ;</td> </tr> <tr> <td>4</td> <td>lacteals, empty into lymph vessels / are part of lymphatic system ;</td> </tr> <tr> <td>5</td> <td>AVP ; e.g. transport of fat in lymph may reduce risk of plaque arteries</td> </tr> </table>	1	fat / fatty acids (and glycerol), absorbed (in ileum) ;	2	ref. to making fat water soluble ;	3	fat enters lacteals ;	4	lacteals, empty into lymph vessels / are part of lymphatic system ;	5	AVP ; e.g. transport of fat in lymph may reduce risk of plaque arteries	[max 2]	other possible AVP <i>idea that</i> not overloading blood with fat / by-passes the liver / goes to adipose tissue first
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(c) (i)	mitosis ;	[1]											
(ii)	antibody ;	[1]											
(iii)	ref. to antibodies in context of, immobilising / 'marking' / agglutinating, bacteria ; phagocytosis (by cell R) ; (bacteria) ingested / engulfed ; into a, vacuole / vesicle ; digested / broken down ; by, enzymes / acid ;	[max 3]	A any alternative wording for effect on bacteria A cell R is a phagocyte I 'killed' / destroyed (in question) unless qualified										

Question	Answers		Marks	Additional Guidance
3 (d)	1 2 3 4 5	positive correlation ; more antibiotics used, more bacteria are resistant ; variation between countries at each dosage ; data quote 1 ; data quote 2 ; e. countries with antibiotic use of <1%, less than 10% bacteria are resistant countries with antibiotic use of 3(+)% , more than 40% bacteria are resistant variation – e.g. some countries at 2.5%, with 4.5% and 32.5%	[max 3]	data quotes must have figure (or range) for use of antibiotics and % resistance
(e)	1 2 3 4 5 6 7 8 9 10	<i>accept ora</i> bacteria are resistant to some antibiotic ; ref. to selection ; result of overuse ; some are specific ; some antibiotics used for rare disease(s) ; some only used as last resort ; have (many / unpleasant) side-effects / harmful / cause allergy ; too expensive ; cannot be used on children ; AVP ; ref. to other uses, e.g. on animals	[max 3]	R <u>people</u> become, immune / resistant
[Total: 15]				