

Drugs

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Drugs
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 1

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Time Allowed: 48 minutes

Score: /40

Percentage: /100

Question		E	Answers	Marks	Additional Guidance
1	(a)	1	<i>water jacket</i> maintain optimum / constant temperature ;	max 4	A prevent overheating R fungus denatures MP 6 must be linked to MP4 or 5
		2	to prevent <u>enzymes</u> denaturing ;		
		3	loss of shape / ref. to active site ;		
		4	(because as) fungus respire ;		
		5	releases heat ;		
		6	so temperature in the fermenter increases ;		
		7	which would kill fungus ;		
		8	(therefore) no, product / penicillin / AW ;		
		9	<i>addition of acids and alkalis</i> maintains pH / keeps pH constant ;	max 3 = max 6	R to maintain neutral pH R fungus needs optimum pH A stop enzymes denaturing
		10	<u>enzymes</u> need optimum pH ;		
		11	(otherwise) enzyme activity / rate of reaction, slows ;		
		12	to give maximum yield / AW		
	(b)	(i)	40–50 / 40–60 / 40–80 ;	1	R 40–45 / 50–60 / 60–80
		(ii)	mitosis ;	1	
		(iii)	1 nutrients are used up ; 2 <u>limiting</u> (factors) ; 3 explanation of limiting factor ; 4 waste products accumulate ; 5 wastes are toxic ; 6 penicillin could inhibit growth ; 7 population reaches carrying capacity ; 8 AVP ;	max 3	A food A factor in shortest supply / AW

Question			Answers	Marks	Additional Guidance
1	(c)	(i)	fungus grows when no penicillin produced ; during first 20 hours ; only nutrients and fungus added at the beginning / no penicillin added ;	max 2	
		(ii)	penicillin production stopped / no more penicillin produced ;	1	accept yield stays the same
	(d)		purifying / separating, penicillin ; from, waste / toxins / AW ; concentration ; making into, pills / packaging / AW ; AVP ; e.g. colour / taste	max 3	R 'make into a medicine'
	(e)		viruses are not cells ; viruses have no metabolism ; <i>idea that viruses have no target for antibiotics ;</i> antibiotics stop cell wall growth ; viruses have no cell wall ; antibiotics stop enzymes working ;	max 2	ignore 'viruses are not alive' A viruses do not have ribosomes A viruses have no enzymes
				[Total: 19]	

Question	E	Answers	Marks	Additional Guidance
2 (a)	1 2 3 4 5 6	enter, blood / plasma / lymph ; infect / enter, white blood cell / lymphocyte / phagocyte / AW ; infect, brain / liver / lungs / skin / reproductive system / kidney / gut ; cannot reproduce ; may be transmitted to another person ; e.g. of method of transmission ; R excreted, die	[max 2]	A ref. to antibodies combining with virus A 'attack' / 'invade' white blood cells A 'attack' / 'invade' / enter MP6 A sexual intercourse / in blood / in breast milk / across placenta / needle stab
(b)	1 2 3 4 5 6 7 8 9 10	infects / destroys / kills, phagocytes ; destroys / kills / disables, <u>lymphocytes</u> ; fewer antibodies produced ; ref. to, T lymphocytes / T cells ; slow / no / weaker, immune response / response by immune system ; <i>idea of increased susceptibility to</i> disease / infection / (named) pathogens ; A viruses / bacteria cancers ; fungal infections / TB / pneumonia / named disease linked with HIV ; R common cold develop AIDS ; AVP ;	[max 3]	A no phagocytosis A fewer lymphocytes R 'attacks' / 'damages' A 'immune system not working' A suppresses / damages, immune system A 'can't fight disease' MP3–8 A <i>answers that give role(s) of immune system followed by 'this doesn't happen'</i>
(c) (i)		(substance) changes / modifies / affects, (chemical) reactions in the body / how the body works ;	[1]	I category of drug, medicine, specific effects of named drug, etc.
(ii)		<i>antibiotics</i> if 'antibodies' written rather than antibiotic – mark to max 1 are not effective against viruses / only effective against bacteria ; <i>idea that</i> nothing for them to act on ; e.g. cell wall / protein synthesis / cellular structure / capsule	[2]	I viruses inside cells A do not work against viruses A ORA R 'life processes'
			[Total: 8]	

Question	Answer	Mark	Additional Guidance
3 (a) (i)	<i>glucose</i> provides energy / required for (aerobic/anaerobic) respiration ; <i>amino acids</i> used, to make (named), proteins / polypeptides ;	[2]	R to produce / AW, energy A for (cell) growth / make new cytoplasm
(ii)	DNA / chromosome / genetic material, replicates / is copied ; cell membrane / cell wall, develops in the middle of the cell ; binary fission ; bacteria / cell / cytoplasm, divides into two ;	max [2]	ignore mitosis / RNA / chromosomes
(b)	some bacteria were resistant to antibiotic, S / T / both S and T ; fewer were resistant to antibiotic T / antibiotic T is more effective (than S) ; both antibiotics, killed / inhibited growth or reproduction of, (susceptible) bacteria ;	max [2]	R immune / antibodies
(c)	bacteria are resistant ; have reproduced / multiplied, (in culture) ; all genetically identical, so all resistant ;	max [2]	R 'growing / becoming, resistant'

3 (d)	<p><i>antibiotic resistant bacteria are formed by</i> mutation ; change to, DNA/gene ; produces, new/ different, protein ; ref to anything that increases risk of resistance ;</p> <p><i>spread</i> (when antibiotic is used) susceptible/AW, bacteria die ; ORA less competition/example ;</p> <p>ref to fewer limiting factor(s) ; resistant bacteria, reproduce/multiply ; pass on their (DNA/gene(s)/ allele(s)) for (antibiotic) resistance ; ref to, (unprotected) sexual intercourse/many sex partners/AW ; any two methods of transmission (from host to host) ;;</p> <p>AVP ;</p>	max [5]	<p>e.g. not completing the full course /do or taking antibiotics when not necessary</p> <p>e.g. more food/resources (available for resistant bacteria)</p> <p>e.g. body fluids/droplets (in air)/ blood /needles <i>or</i> syringes /food /water/ (named) vector /across placenta / at birth /breast milk</p>
		[Total: 13]	

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