

# Drugs

## Mark Scheme 1

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

**Time Allowed:** 48 minutes

**Score:** /40

**Percentage:** /100

Question		E	Answers	Marks	Additional Guidance
1	(a)		<i>water jacket</i> 1 maintain optimum / constant temperature ; 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 ;	max 4	A prevent overheating R fungus denatures  MP 6 must be linked to MP4 or 5
			9 <i>addition of acids and alkalis</i> maintains pH / keeps pH constant ; 10 <u>enzymes</u> need optimum pH ; 11 (otherwise) enzyme activity / rate of reaction, slows ; 12 to give maximum yield / AW	max 3 = max 6	R to maintain neutral pH  R fungus needs optimum pH A stop enzymes denaturing
	(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	<b>accept</b> 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	<b>R</b> '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	<b>ignore</b> 'viruses are not alive' <b>A</b> viruses do not have ribosomes  <b>A</b> viruses have no enzymes
			<b>[Total: 19]</b>	

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 <b>ORA</b> R 'life processes'
			[Total: 8]	

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

<p>3 (d)</p>	<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 ; <b>ORA</b>  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>	<p>max [5]</p>	<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>
		<p><b>[Total: 13]</b></p>	