

Mark schemes

1	(a)	40 – 60 hours	1	
	(b) (i)	decrease	1	
		1 st slowly then faster / appropriate detail from the graph – e.g. from 7.8 to 0 / faster after 4 – 10h	1	
	(ii)	oxygen after glucose <i>extra box ticked cancels 1 mark</i>	1	
		oxygen less than glucose	1	
	(iii)	respiration	1	
2	(a) (i)	decrease	1	
		rate of decrease slows	1	
	(ii)	any one from:		
		• <u>more</u> use of disinfectant <i>allow any reasonable increase in hygiene or sterilisation precautions</i>		
		• <u>more</u> use of hand washing		
		• <u>more</u> careful / <u>more</u> often cleaning of patient facilities		
		• raised awareness / education about hygiene	1	
		Explanation: stops / reduces the bacteria being transferred / spreading	1	
(iii)	$800 - 500 / 800 \times 100 =$	1		
	37.5 (%) <i>correct answer with or without working gains 2 marks</i>	1		
(iv)	any one from:			
	• numbers quite low now so hard to reduce further			
	• was a big campaign / much publicity (in 2009) so more people already doing it			
	• hygiene / cleaning now good so hard to improve			
	• hospitals short of money so less staff to clean	1		

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- (b) mutation occurred giving resistance (to methicillin)
*do **not** accept overuse caused mutation*

1

resistant bacteria not able to be treated / not killed

1

these bacteria multiplied / reproduced / spread quickly

1

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3

- (a) (i) any **one** from:

- cells
- tissues
- (live) animals / named
allow mammals

1

- (ii) any **three** from:

(to test for)

- toxicity / check not poisonous / not harmful
allow side-effect
allow converse
- interaction with other drugs
- efficacy **or** to see if they work **or** check if they treat the disease
allow converse
- dosage **or** how much is needed

3

- (b) **argued evaluation**

*comparison can be written anywhere in evaluation allow use of 'only' for implied comparison for each point eg **only** statins damage muscles / kidneys / organs*

any **six** from:

- statin can damage / muscles / kidneys / organs but cholesterol blockers don't
ignore liver
if neither of the first 2 points are given accept for 1 mark
- statins can cause death but cholesterol blockers don't
*statins are more dangerous than cholesterol blockers **or** statins have more side effects*

- cholesterol blockers can interfere with action of other drugs but statins don't
- statins are for a life time but cholesterol blockers are not
- statins (might) reduce cholesterol to zero but cholesterol blockers only reduce it **or** statins reduce cholesterol more
allow statins (might) stop membrane / hormone production but cholesterol blockers don't
- statins better for people with inherited high cholesterol
- cholesterol blockers better for people with dietary cholesterol problems
- taking/using statins/cholesterol blockers is better than dying from heart attack or build up of fat in blood vessels or reduced blood flow

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4

(a) hearsay

1

(b) (volunteers with feet in) empty bowls

accept bowl with no (iced) water

*do **not** accept mention of bowl with iced water*

1

(c) any **three** from:

ignore control variables, eg age, gender

- only some of those whose feet were in cold water caught colds
- some controls caught colds
- only feet were cold in experimental group
allow (control) not wrapped up warm
- only kept feet in cold water for 20 minutes
- insufficient evidence for 'proof' / only showed increased risk
allow small sample size
- don't know activities of individuals before / after the investigation (eg exposure to cold virus) / reference to immune system
allow investigation done in 'cold season'

3

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5

- (a) (i) kills / gets rid of / reduces methane bacteria
allow kills / gets rid of / reduces bad bacteria
ignore acts like antibiotic 1
- (ii) less food converted to methane
allow can keep more cattle without further environmental damage
ignore energy 1
- more growth / meat / muscle / milk produced / more profit / fatter animals
ignore references to bacteria and disease 1
- (b) absorbs energy / heat radiated by Earth
allow absorbs / traps energy / heat / from Earth
*do **not** allow absorbs energy / heat from Sun* 1
- some energy / heat reradiated
ignore reflected
*do **not** allow reradiates energy / heat from Sun* 1
- leading to global warming / enhanced greenhouse effect
accept effects of global warming eg melting ice caps
accept methane is a greenhouse gas
ignore references to ozone 1

[6]

6

- (a) dead or inactive or weak form of pathogen / bacterium / virus / microorganism introduced
ignore disease / germ 1
- (stimulates) white cells / lymphocytes / leucocytes
accept B and T cells
ignore phagocytes 1
- to produce antibodies
ignore antitoxins / antigens 1
- antibodies made quickly on re-infection / idea of memory cells
ignore already has antibodies
ignore 'body remembers' 1

- (b) (i) alters / causes chemical processes / body chemistry
ignore craving / withdrawal symptoms 1
- (ii) any **two** from:
- combined molecule / vaccine stimulates antibody production
 - if nicotine taken, antibodies bind to nicotine molecules
ignore destroys nicotine
 - making them too large to get to brain / making them ineffective
allow prevents nicotine entering brain 2

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7

- (a) don't kill pathogens / bacteria / viruses / microbes / microorganisms
allow don't contain antibiotics
ignore antibodies / attack / fight
allow only treat symptoms / pain
ignore kill disease / germs 1

- (b) any **two** from:
- age
 - gender
 - extent / severity of pain
or how long had pain before trial
 - type of pain / illness / site of pain
accept 'the pain' for 1 mark, if neither extent or type given
ignore pain threshold
 - (body) mass / weight / height
allow body size / physique
 - other medical issues / drugs taken / health / fitness
 - ethnicity 2

- (c) (i) 75
ignore calculations / % 1

- (ii) faster pain relief / decrease
allow pain relief sooner
or it works quicker
or more pain relief at start / in first $1 / 1\frac{3}{4}$ hours

1

- (iii) decrease of pain higher / more
ignore more effective unless qualified by time $> 1\frac{3}{4}$ hours
allow effect lasts longer

1

decrease of pain is longer lasting

1

- (d) any **three** from:
ignore yes or no

(Yes because)

- rapid pain relief (from A)
- long lasting pain relief (from B)
- and it costs less
- the sum of the pain relief (from A + B) is greater (than X)

(No because)

- drug X gives more pain relief
- (A + B / they) might interact with each other
- could result in overdose
- could be more / new side effects

if neither points gained
allow (more) dangerous

3

[10]

8

- (a) (i) dead / inactive / weakened
allow antigen / protein
ignore ref to other components
ignore small amount

1

- pathogen / bacterium / virus / microorganism
ignore germs / disease 1
- (ii) *antigen / antibiotic instead of antibody = max 2*
- white blood cells produce / release antibodies
accept lymphocytes / leucocytes / memory cells produce antibodies
*do **not** accept phagocytes* 1
- antibodies produced quickly 1
- (these) antibodies destroy the pathogen
allow kill
*do **not** accept antibodies engulf pathogens* 1
- (b) (i) (live) bacteria still in body
ignore numbers 1
- would reproduce
ignore mutation / growth 1
- (ii) antibiotics / treatment ineffective **or** resistant pathogens survive
accept resistant out compete non-resistant 1
- these reproduce 1
- population of resistant pathogens increases
allow (resistant pathogens reproduce) rapidly 1

[10]