Mark schemes

1

(a) 40 – 60 hours

(b) (i) decrease

1st slowly then faster / appropriate detail from the graph – e.g. from 7.8 to 0 / faster after 4 – 10h

(ii) oxygen after glucose

extra box ticked cancels 1 mark

oxygen less than glucose

(iii) respiration

2

2

(a) (i) decrease

rate of decrease slows

(ii) any one from:

• more use of disinfectant

allow any reasonable increase in hygiene or sterilisation precautions

• more use of hand washing

• more careful / more often cleaning of patient facilities

• raised awareness / education about hygiene

Explanation:

stops / reduces the bacteria being transferred / spreading

(iii) 800 – 500 / 800 × 100 =

37.5 (%) correct answer with or without working gains 2 marks

(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
(b) mutation occurred giving resistance (to methicillin)

\textit{do not accept overuse caused mutation}

resistant bacteria not able to be treated / not killed

these bacteria multiplied / reproduced / spread quickly

(a)

(i) any one from:

- cells
- tissues
- (live) animals / named
  \textit{allow mammals}

(ii) any three from:

(to test for)

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

(b) \textbf{argued evaluation}

\textit{comparison can be written anywhere in evaluation allow use of}
\textit{‘only’ for implied comparison for each point eg only statins damage}
\textit{muscles / kidneys / organs}

any six from:

- statin can damage / muscles / kidneys / organs but cholesterol blockers don’t
  ignore liver
  \textit{if neither of the first 2 points are given accept for 1 mark}
- statins can cause death but cholesterol blockers don’t
  \textit{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
  \[allow \text{statins (might) stop membrane / hormone production but cholesterol blockers don’t}\]
• 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

(a) hearsay

(b) (volunteers with feet in) empty bowls
  \[accept \text{bowl with no (iced) water}\]
  \[do \text{not accept mention of bowl with iced water}\]

(c) any three from:
  \[ignore \text{control variables, eg age, gender}\]
  • only some of those whose feet were in cold water caught colds
  • some controls caught colds
  • only feet were cold in experimental group
    \[allow \text{(control) not wrapped up warm}\]
  • only kept feet in cold water for 20 minutes
  • insufficient evidence for ‘proof’ / only showed increased risk
    \[allow \text{small sample size}\]
  • don’t know activities of individuals before / after the investigation (eg exposure to cold virus) / reference to immune system
    \[allow \text{investigation done in ‘cold season’}\]
(a) (i) kills / gets rid of / reduces methane bacteria
   allow kills / gets rid of / reduces bad bacteria
   ignore acts like antibiotic

(ii) less food converted to methane
   allow can keep more cattle without further environmental damage
   ignore energy

   more growth / meat / muscle / milk produced / more profit / fatter animals
   ignore references to bacteria and disease

(b) absorbs energy / heat radiated by Earth
   allow absorbs / traps energy / heat / from Earth
   do not allow absorbs energy / heat from Sun

   some energy / heat reradiated
   ignore reflected
   do not allow reradiates energy / heat from Sun

   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

6 (a) dead or inactive or weak form of pathogen / bacterium / virus / microorganism introduced
   ignore disease / germ

   (stimulates) white cells / lymphocytes / leucocytes
   accept B and T cells
   ignore phagocytes

   to produce antibodies
   ignore antitoxins / antigens

   antibodies made quickly on re-infection / idea of memory cells
   ignore already has antibodies
   ignore ‘body remembers’
(b) (i) alters / causes chemical processes / body chemistry

ignore craving / withdrawal symptoms

(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

(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

(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

(c) (i) 75

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

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

   decrease of pain is longer lasting

(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

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

8
pathogen / bacterium / virus / microorganism
ignore germs / disease

(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

antibodies produced quickly

(these) antibodies destroy the pathogen
**allow kill**
**do not** accept antibodies engulf pathogens

(b) (i) (live) bacteria still in body
ignore numbers

would reproduce
ignore mutation / growth

(ii) antibiotics / treatment ineffective or resistant pathogens survive
accept resistant out compete non-resistant

these reproduce

population of resistant pathogens increases
**allow (resistant pathogens reproduce) rapidly**