1.

(a) toxins / poisons (secreted by / from / in bacteria) **1**

(b) any **two** from:

- wash hands after using toilet / being sick
  or
  wash hands before preparing / handling food
  or
  do not prepare food (whilst infected)
  ignore 'wash hands' unqualified
  ignore reference to coughing / sneezing
- isolate yourself
  allow examples of how isolation could be achieved
- disinfect clothes / surfaces
- do not share utensils / cutlery / towels

2

(c) antibiotics
allow named examples of antibiotics

1

(d) immune system is damaged / weakened **or** immune system doesn't function properly
allow immunocompromised
allow lack of / no white blood cells

1

white blood cells cannot kill bacteria / *Salmonella* (as effectively)
*allow no / fewer antibodies so bacteria not killed **or** less phagocytosis so bacteria not killed **or** no / fewer antitoxins to counter toxins*

1

(e) any **one** from:

- (give chickens) antibiotics
  allow (give chickens) monoclonal antibodies
- don't sell infected chickens / eggs
  allow don't sell the chickens / eggs
  ignore don't sell chickens / eggs
- keep infected chickens isolated / indoors
  allow keep the chickens indoors
  ignore keep chickens indoors
- slaughter the infected chickens
  ignore vaccination / chlorination / disinfection

1

(f) (cleaning liquid) B
and
greater reduction in number of bacteria (after cleaning) in both locations

ignore few bacteria in both locations

*allow neither / both **and** idea of experimental error*

1

(g) radius (of area with no bacteria growing)

allow diameter (of the area with no bacteria growing)

ignore πr^2 unqualified

allow idea of placing agar plate onto graph paper and counting the squares not covered with bacteria

1

(h) repeat **and** look to see if results are similar

ignore repeat unqualified

*allow repeat **and** look to see if results are different*

allow repeat and see if there are anomalies

ignore repeat and identify anomalies
ignore repeat and compare unqualified

1

(i) any **one** from:

- toxicity / side / health effects

  ignore harmful / dangerous
  allow reference to allergies

- effect on other types of bacteria / pathogens

  allow not tested on other types of bacteria
  ignore germs

- interaction with other cleaners
- ease of use
- dilution factor of each cleaner (vs. cost)

  ignore concentration unqualified

- time cleaner is effective for

  ignore how long the cleaner lasts for

  allow reference to odour of cleaning liquid

  ignore reference to cost unqualified
  ignore environmental effects / flammability

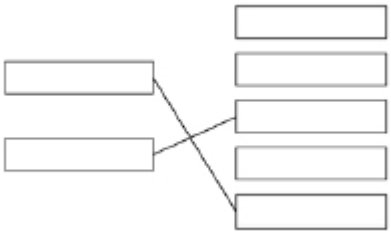
1

[11]

2. (a) bacteria

1

(b)



extra line from a drug negates the mark for that drug

2

(c) any **one** from:

- to check they are safe
- to check they are effective

  allow to check they work or to check for the (right) dose

- to check for side effects

  allow to check for toxicity

1

(d) testing on healthy volunteers

1

(e) **Level 2 (3-4 marks):**
Relevant points (reasons / causes) are identified, and there are attempts at logical linking.

Level 1 (1-2 marks):
Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

0 marks:
No relevant content

Indicative content

- dead / inactive pathogen
- introduced to the body
- white blood cells respond
- produce antibodies
- antibodies are specific to pathogen
- antibodies produced quickly (on reinfection) / rapid response
- in larger quantities
- killing the pathogen

[9]

3. (a) a fungus

1

(b) **Level 3 (5-6 marks):**
Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

Level 2 (3-4 marks):
Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

Level 1 (1-2 marks):
Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

Level 0
No relevant content

Indicative content

	defence	**description of defence**
animals	skin	sebum / oils to kill microbes dead layer difficult to penetrate
	nose	hairs keep out dust and microbes
	trachea / bronchi	mucus traps microbes cilia moves mucus
	stomach	(hydrochloric) acid kills bacteria
	white blood cells	produces antibodies produces antitoxins engulf microbes / phagocytosis
plants	cell wall	tough / difficult to penetrate
	waxy cuticle	tough / difficult to penetrate
	dead cells / bark	fall off, taking pathogens with them
	production of antibacterial chemicals	kill bacteria
fungi	antibiotic production	kill bacteria

6

(c) any **three** from:

- sterilise agar (before use)
- sterilise (Petri) dish before use
- disinfect bench (before use)
- pass inoculating loop (through flame)
- secure lid with (adhesive) tape
- minimise exposure of agar / culture to air / lift and replace lid as quickly as possible

allow:

- *dip loop into ethanol (after flaming)*
- *keep the lid on the plate for as long as possible*
  or
  minimise exposure of agar to air
  or
  only tilt the lid off (rather than remove it)
- *flame the neck of the bottle*

3

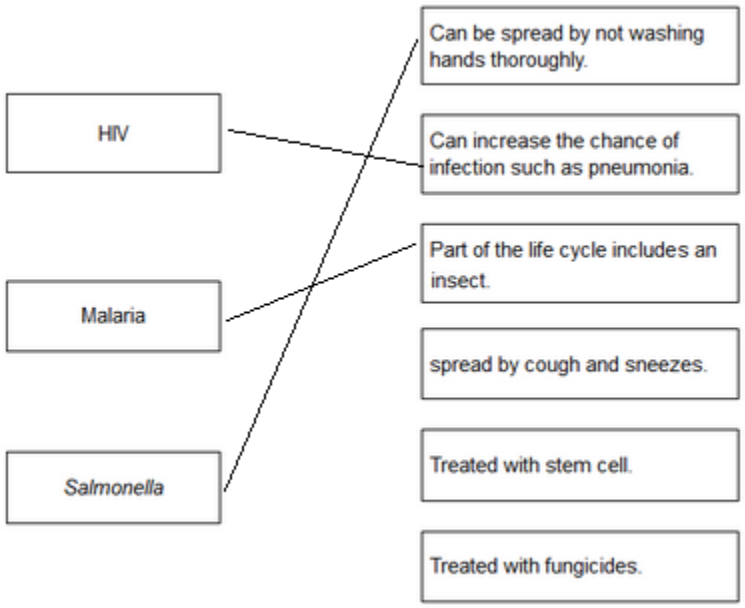
(d) to prevent the growth of a harmful pathogen

1

[11]

4.

(a)



each extra line negates a mark

4

(b) pain when urinating

1

yellow discharge

1

(c) three correct plots

*allow **1** mark for two correct plots*

2

correctly drawn line

1

(d) any **three** from:

- (fairly) level / steady up to 2009

  *allow numbers of males fall (slightly) **and** females rise (slightly) up to 2009*
- (there is a) rise after 2009
- males are (always) higher than females
- males rising faster than females

  allow overall increase (from 2005 to 2013)

3

(e) HIV is a virus

1

(and) antibiotics are only effective against bacteria
or
antibiotics do not kill viruses

allow viruses live inside cells

1

[13]

5. (a) to kill virus
or
to prevent virus spreading

1

(b) take (stem) cells from meristem
or
tissue culture

allow take cuttings

1

(c) use Benedict's solution

1

glucoses turns solution blue to orange

1

(d) **Level 2 (3–4 marks):**
A detailed and coherent explanation is provided. The student makes logical links between clearly identified, relevant points that explain why plants with TMV have stunted growth.
Level 1 (1–2 marks):
Simple statements are made, but not precisely. The logic is unclear.

0 marks:
No relevant content.

Indicative content

- less photosynthesis because of lack of chlorophyll
- therefore less glucose made
  so
- less energy released for growth
- because glucose is needed for respiration
  and / or
- therefore less amino acids / proteins / cellulose for growth
- because glucose is needed for making amino acids / proteins / cellulose

4

[8]