Section 9 – Communicable Disease

Answer Key

9.1	**What is meant by the term communicable disease?**	**A communicable disease is caused by viruses, bacteria, protists and fungi, which are spread in animals and plants.**
9.2	**Name 4 ways that a pathogen can be transmitted and then prevented,**	**Transmitted :Through air, through water, direct contact (e.g. STD's), vectors.** **Prevented : Handwashing, safer sex practices, vaccination, eradication of vectors.**
9.3	**State 4 types of pathogens.**	**Viruses, bacteria, protists, fungi**
9.4	How does bacteria make you ill?	Bacteria may produce poisons (toxins) that damage tissues and make us feel ill.
9.5	Why might viruses cause you more damage?	Viruses live and reproduce inside cells, causing cell damage.
9.7	**What does a vaccine contain and how does it work?**	**A small quantity of dead or inactive forms of a pathogen. It stimulates the white blood cells to produce antibodies. If the same pathogen re-enters the body the white blood cells respond quickly to produce more of the correct antibodies quickly, preventing infection.**
9.8.	What is herd immunity?	The majority of the population is vaccinated against serious diseases, which can reduce the chance of people coming into contact with specific pathogens.
9.9	**How do antibodies work?**	**Destroys pathogens.**
9.10	How are drugs tested ?	**1. Preclinical** testing is done in a laboratory using cells, tissues and live animals. **2.** Clinical trials use small numbers of healthy volunteers and patients. Very low doses of the drug are given at the start of the clinical trial. **3.** If the drug is found to be safe, further clinical trials on larger groups of healthy volunteers and patients are carried out to find the optimum dose for the drug.
9.11	What is meant by a double blind trial?	**In double blind trails, some patients given a placebo.** **Neither the doctor nor patient know whether they have been given a placebo in order to reduce potential bias.**
9.12	**What is a placebo?**	**A substance that has no therapeutic effect, used as a control in testing new drugs.**

Section 10 – Non Comunicable Disease

Answer Key

10.1	What is meant by the term non communicable disease?	Diseases that develop and are not transferred between people and other organisms
10.2	Name 3 examples of a non-communicable disease.	Cancer, Diabetes, genetic diseases and Conditions, heart disease, neurological disorders
10.3	What is a risk factor?	Something that can increase the chances of developing a non-communicable disease
10.4	**State 3 risk factors.**	**Lifestyle, diet, stress, situations that may occur in a person's life (trauma)**
10.5	**What is cancer?**	**Change in cells that leads to uncontrolled growth and cell division,causing a tumour to develop**
10.6	**Name 2 types of tumours**	**Benign and malignant**
10.7	. What is a correlation?	A relationship between 2 sets data, such that when one changes you would expect the other one to change.
10.8	State 3 different effects of smoking	Cancers, heart disease, COPD/pulmonary disease, diabetes, increased chances of blood clot or stroke, addiction, narrowing of arteries, pneumonia, emphysema and discolouration of the skin.
10.9	State the long-term effects of alcohol abuse.	High blood pressure, stroke, pancreatitis, liver disease, liver cancer, mouth cancer, depression, dementia, sexual problems, infertility
10.10	What are the short-term effects of alcohol?	Increased heart rate, dilation of blood vessels, effects the brain (judgement, co-ordination and decision making), blurred vision, slower reaction time, slurred speech, dehydration and vomiting
10.11	**State the potential effects of obesity.**	**Type II diabetes, coronary heart disease, cancer, stroke, depression and low self-esteem.**

Section - Immunity

Answer Key

1.	What is an antigen?	Proteins on cell surface for cell recognition.
2.	What is a toxin?	A chemical produced by a bacteria which damages tissues and makes us feel ill.
3.	**What drugs must patients who receive a transplant take? Why?**	**Immunosuppressant drugs to prevent rejection**
4.	**What is phagocytosis?**	**When a phagocyte (WBC) detects a pathogen, binds to it, then engulfs it. Enzymes then break down the pathogen.**
5.	**What is the purpose of a memory cell?**	**Remember the same pathogen for faster antibody production, if a person is exposed to it again**
6.	Why is the secondary response quicker that the primary immune response?	Memory cells already know what antibodies to make to destroy the pathogen. This is done in much quicker time than when you encounter the pathogen.
7.	What are antibodies?	A protein produced in response to a specific antigen.
8.	What pathogen do antibiotics treat?	Bacteria
9.	How might an antibiotic be useless against bacteria?	The bacteria may be resistant to the antibiotic.

Foundation Tier

Q1.

Antibiotics are used to treat bacterial infections.

(a) Which substance is used as an antibiotic?

Tick (✓) **one** box.

Aspirin ☐

Digitalis ☐

Penicillin ☐

(1)

Gonorrhoea and chlamydia are two sexually transmitted infections.

Gonorrhoea and chlamydia infections can be treated with antibiotics.

(b) Give **one** symptom of gonorrhoea.

_____

_____

(1)

A scientist investigated which antibiotics were most effective at treating gonorrhoea and chlamydia.

This is the method used.

1. Grow gonorrhoea bacteria in a Petri dish.
2. Prepare four different antibiotic solutions, **A**, **B**, **C** and **D**, of the same concentration.
3. Cut four filter paper discs to the same size.
4. Soak each paper disc in a different antibiotic solution.
5. Put the four paper discs into the Petri dish.
6. Repeat steps 3 to 5 using a Petri dish with chlamydia bacteria growing in it.
7. Keep both Petri dishes at 25 °C for 3 days.

(c) Give **two** control variables used in this investigation.

1 _____

_____

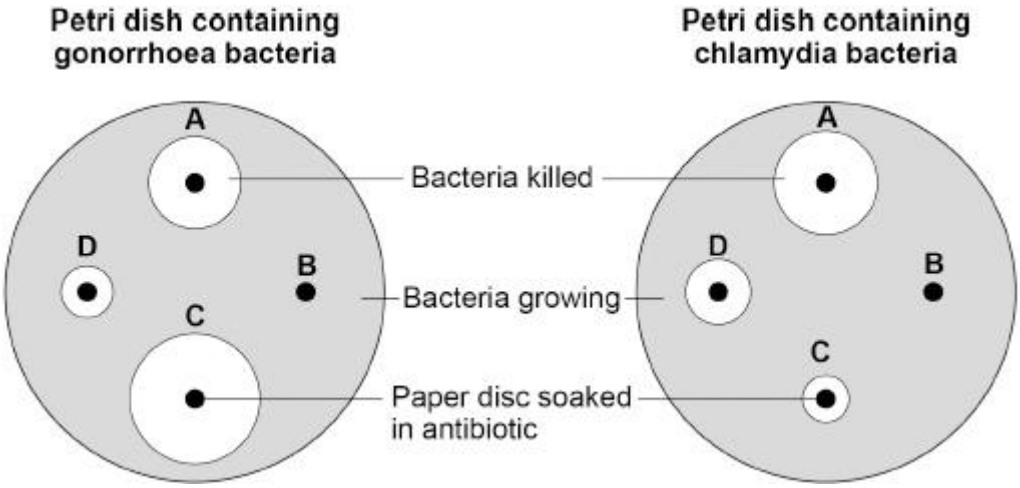
2 _____

_____

(2)

The figure below shows the results.

A clear area around a paper disc is where the antibiotic has killed the bacteria.



(d) Which antibiotic did **not** kill either type of bacterium?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(e) Which antibiotic would be the most effective to treat a person with a **gonorrhoea** infection?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(f) Which antibiotic would be the most effective to treat a person who had both gonorrhoea **and** chlamydia infections?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(g) Antibiotics **cannot** be used to treat HIV infections.

Suggest **one** reason why.

_____

_____

(1)

Fungi can cause an infection of the fingernails and toenails.

Fungal nail infections can spread from one person to another person.

(h) Some people go to nail salons to have their nails shaped and painted.

Suggest **one** way workers in nail salons can reduce the risk of infections being spread.

_____

_____

(1)

(i) Suggest **one** reason why fungal infection of toenails is more common than fungal infection of fingernails.

_____

_____

(1)

(Total 10 marks)

Q2.

A nose spray has been produced.

The nose spray puts a thin layer of gel in the airways between the nose and the lungs.

The manufacturer of the nose spray claims that:

'The nose spray defends against diseases such as the common cold.'

(a) Why is the manufacturer's claim difficult to test?

Tick (✓) **one** box.

A symptom of the common cold is a cough.	☐
The common cold does **not** spread through drinking water.	☐
We do **not** know who will get the common cold.	☐

(1)

(b) The nose spray was tested as a new medical drug.

In the drug trial some patients were given a nose spray with **no** drug.

What is the word used to describe the nose spray with **no** drug?

Tick (✓) **one** box.

Painkiller	☐
Placebo	☐
Statin	☐

(1)

(c) Most medicines contain a mixture of ingredients.

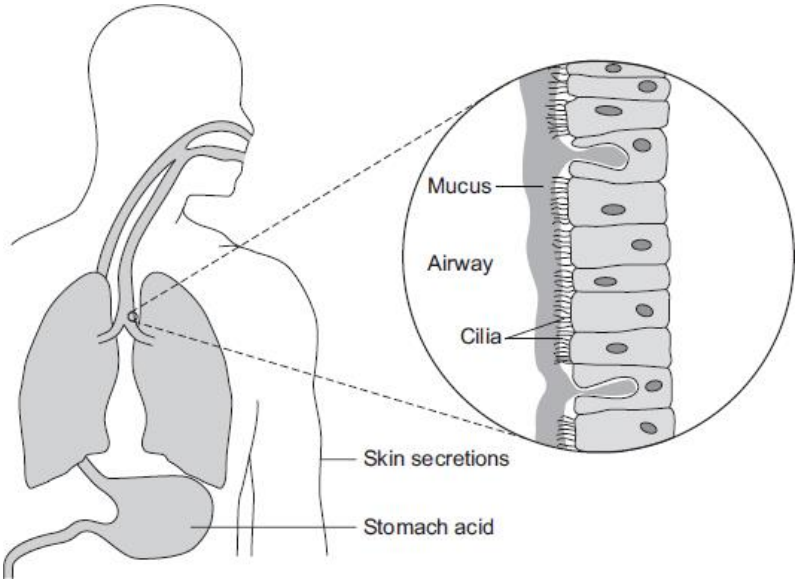
Why do some tablets contain sugar as well as the drug?

Tick (✓) **one** box.

So that the tablet is more difficult to swallow	☐
To decrease the size of the tablet	☐
To improve the taste of the tablet	☐

(1)

The figure below shows some of the ways that the body defends itself against infectious diseases.



(d) Describe how the skin, airways and stomach defend against diseases.

(6)

(Total 9 marks)

Q3.

Pathogenic bacteria and viruses may make us feel ill if they enter our bodies.

(a) Why do bacteria and viruses make us feel ill?

Bacteria _____

Viruses _____

(2)

(b) Most drugs that kill bacteria cannot be used to treat viral infections.

Explain why.

(2)

(c) Antibiotic-resistant strains of bacteria are causing problems in most hospitals.

Explain, as fully as you can, why there has been a large increase in the number of antibiotic-resistant strains of bacteria.

(4)

(Total 8 marks)

Higher Tier

Q4.

(a) Explain how vaccination makes a person immune to a disease.

(4)

(b) Scientists are trialling a 'nicotine vaccine' that might help **wean smokers off** the drug nicotine.
The trials so far have produced very mixed results.
Nicotine molecules are very small and can get through the protective layers around the brain.

(i) How does nicotine cause a person to become addicted?

(1)

(ii) The 'nicotine vaccine' is made by attaching proteins to nicotine molecules.

After ‘vaccination’ the body reacts to the nicotine in the same way as it reacts to pathogens.

Suggest how the ‘nicotine vaccine’ might help wean a smoker off nicotine.

_____

_____

_____

_____

(2)

(Total 7 marks)

Q5.

HIV infection can prevent the body’s immune system from destroying pathogens.

(a) Explain the roles of white blood cells when a pathogen enters the body.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6)

(b) Name the type of drug that can be used to treat HIV.

_____

(1)

(c) Describe how AIDS is different from HIV infection.

_____

_____

_____

(1)
(Total 8 marks)

Mark Schemes

Q1.

(a) penicillin

1

(b) any **one** from:

- (yellow / green / white / beige) discharge from vagina / penis
  - *ignore colour of urine*
  - *allow yellow / green / white / beige discharge*
- pain on urinating
  - *ignore pain unqualified*
  - *allow pain in abdomen*
  - *allow pain in testes*
  - *allow inflammation of foreskin*
  - *allow bleeding between periods*
  - *allow bleeding after sex*
  - *allow fever / nausea / vomiting*

1

(c) any **two** from:

- concentration (of antibiotic)
- type of disc
  - *allow same type of (filter) paper*
- size of disc
- temperature **or** kept at 25 °C
- time **or** kept for 3 days
  - *allow use sterile Petri dish **or** use sterile agar*

2

(d) B

1

(e) C

1

(f) A

1

(g) any **one** from:

- antibiotics do **not** destroy viruses
  - *allow antibiotics do **not** kill viruses*
  - *allow antibiotics **only** kill bacteria*
  - *allow HIV is a virus*
  - *allow HIV is **not** a bacterium*
- viruses are inside cells
  - *allow idea that it is difficult to get the antibiotic to the virus*

1

(h) any **one** from:

- disinfect / sterilise tools / scissors / files

  allow put tools / scissors / files in fungicide

  allow washing / cleaning tools
- use a new file for each customer

  allow use a new tool / scissors for each customer
- do not treat people with a fungal nail infection
- disinfect hands between customers
- use new gloves for each customer

  ignore gloves / PPE unqualified

  allow wear masks

1

(i) any **one** from:

allow converse statements

- feet are washed less
- feet are in (more) moist conditions

  allow idea that less air gets to feet

  allow idea that feet are wetter / warmer (inside socks)
- feet are (often) warmer

  allow idea of (bare) feet in contact with the floor

  allow idea of sharing footwear

1

[10]

Q2.

(a) we do **not** know who will get the common cold

1

(b) placebo

1

(c) to improve the taste of the tablet

1

(d) **Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.

4–6

Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.

1–3

No relevant content

0

Indicative content General

- (many / infectious) diseases are caused by pathogens / microorganisms / bacteria / viruses / microbes

- skin / airways / stomach prevent entry of pathogens

Skin
- skin is a (physical) barrier
- scabs form over cuts forming a barrier
- platelets are needed to form the scab
- skin produces antimicrobial secretions
- that kill pathogens / microorganisms / bacteria / viruses / microbes

Airways
- some pathogens / microorganisms / bacteria / viruses / microbes spread via air **or** are breathed in
- trachea / airways secrete mucus
- mucus traps pathogens / microorganisms / bacteria / viruses / microbes
- mucus moved by cilia
- mucus moved upwards
- mucus is swallowed

Stomach
- (mucus / pathogens) enter(s) stomach which contains acid
- stomach acid kills pathogens / microorganisms / bacteria / viruses / microbes in mucus
- stomach acid kills (most) pathogens / microorganisms / bacteria / viruses / microbes that are in food

Responses referring to only skin **or** airways **or** stomach are **Level 1**.

[9]

Q3.

(a) (bacteria) produce toxins / poisons

1

(viruses) damage / kills cells **or** toxins released from cell

1

(b) any **two** from:

- viruses live inside cells
- viruses inaccessible to drug
- drug would damage body cells / tissue

2

(c) any **four** from:

- overuse of antibiotics
- bacteria mutate

  *do **not** allow antibiotic causes mutation*
- antibiotics kill non-resistant strains **or** idea of selection

- reduced competition
- resistant bacteria reproduce

4

[8]

Q4.

(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

[7]

Q5.

(a) phagocytosis

allow engulfing / ingestion of pathogens

*do **not** accept eats pathogens*

1

producing antibodies

1

(which) attach to pathogen

or
(which) make pathogens clump together

allow attaches to antigens on pathogen
allow (antibodies) cause agglutination
ignore kills pathogen unqualified

1

producing antitoxins

1

(which) destroy toxins released by pathogen

1

(some WBC are) memory cells which respond quickly on reinfection
or
(some WBC) recognise pathogens / antigen and respond quickly on reinfection

1

(b) antiretroviral

allow correctly named example of antiretroviral used to treat HIV
for example, tenofovir / emtricitabine / lamivudine / efavirenz
ignore prep
ignore antiviral
*do **not** accept antibiotics*

1

(c) HIV is an infection by a virus, whereas AIDS is the consequences in the body from HIV infection

allow HIV is an infection by a virus
*whereas in AIDS the immune system can no longer deal with **other** infections / cancer*

1