

Infection and diseases – GCSE Biology Paper 1

1. No.2

0 2

Viruses cause disease.

0 2

1

What name is given to microorganisms that cause disease?

[1 mark]

Tick (✓) **one** box.

Pathogens

☒

-disease causing organisms

Predators

☐

- animals that kill others for food

Producers

☐

- photosynthetic algae and plants

0 2

2

The body has defences to stop viruses entering.

Draw **one** line from each defence to the part of the body that provides the defence.

[2 marks]

Defence

Part of the body that provides the defence

A physical barrier that stops viruses entering

Mucus that traps viruses

Brain

Heart

Nose

Skin

Some viruses can cause tumours to develop.

0 2 . 3

Complete the sentence.

Choose the answer from the box.

[1 mark]

digestion	division	metabolism
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A tumour can form when changes to cells cause uncontrolled

cell division.

0 2 . 4

Malignant tumours are cancers.

Which **two** sentences describe malignant tumours?

[2 marks]

Tick (✓) **two** boxes.

Malignant tumours are only found in the reproductive system.

malignant tumours found in all body organs

Malignant tumours contain digestive enzymes. *- no enzymes in tumours*

Malignant tumours do not change in size. *- They increase in size*

Malignant tumours have cells that can spread to other parts of the body.

Malignant tumours may form secondary tumours.

☐
☐
☐
☒
☒

HPV is a virus that can cause one type of cancer in females.

In the UK since 2008, most 12 to 13-year-old females have been vaccinated against HPV.

Scientists investigated the percentage of 16 to 18-year-old females with HPV.

Table 2 shows the results.

Table 2

Year	Percentage (%) of 16 to 18-year-old females with HPV
2010	8.2
2012	3.2
2014	2.0
2016	1.6

0 2 . 5

What does **Table 2** show about the percentage of females with HPV from 2010 to 2016?

[1 mark]

It shows percentage decrease of females with HPV over the years from 2010-2016.

0 2 . 6

Suggest the reason for the change you described in Question **02.5**.

[1 mark]

More females were vaccinated over time.

The HPV vaccine contains an inactive form of the virus.

The inactive form of the virus is injected into the body.

0 2 . 7

Which part of the blood responds to the inactive virus?

[1 mark]

Tick (✓) **one** box.

Platelets

☐

- for blood clotting

Red blood cells

☐

- transports oxygen to body tissues

White blood cells

☒

0 2 . 8

What is produced by the body in response to the inactive virus?

[1 mark]

Tick (✓) **one** box.

Antibiotics

drugs against bacteria

☐

Antibodies

☒

Antiseptics

☐

- chemical that slows down growth of pathogens on surfaces.

0 2 . 9

Suggest **one** reason why some **parents** refuse to allow their children to have the HPV vaccine.

Do **not** refer to the pain of the injection in your answer.

[1 mark]

- People are afraid of side effects of HPV vaccine
- Some people believe HPV vaccines don't work

2. No.4

0 4

Malaria is caused by a protist.

The protist is passed from one person to another person by mosquitos.

0 4

1

Which term describes the mosquito?

[1 mark]

Tick (✓) **one** box.

Bacterium

☐

-pathogen

Gene

☐

-factor of heredity

Vector

☒

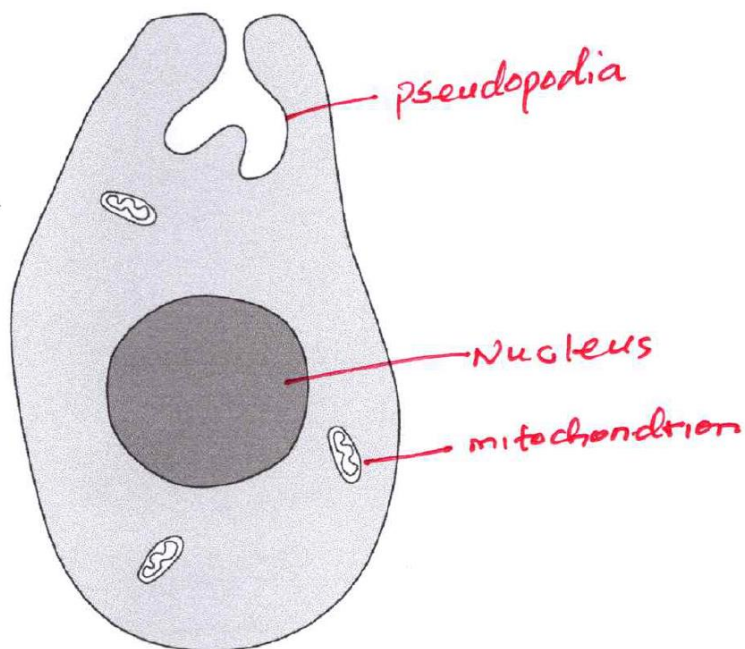
0 4

2

The malarial protist is a eukaryotic cell.

Figure 2 shows a malarial protist.

Figure 2



Give **two** features of the malarial protist that show the cell is eukaryotic and **not** prokaryotic.

[2 marks]

- 1 Mitochondria
Plasmids absent
- 2 It has a nucleus

0 4 . 3

Which organism is prokaryotic?

[1 mark]

Tick (✓) **one** box.

- | | | |
|------------|-------------------------------------|------------------------|
| Cow | ☐ | - eukaryote |
| Grass | ☐ | - producer (eukaryote) |
| Salmonella | ☒ | - prokaryote |

0 4 . 4

The malarial protist reproduces asexually.

What is a feature of asexual reproduction?

[1 mark]

Tick (✓) **one** box.

- | | | |
|---------------------------------------|-------------------------------------|------------------------|
| Only one parent is involved. | ☒ | - asexual reproduction |
| The offspring show genetic variation. | ☐ | - sexual reproduction |
| Two gametes fuse. | ☐ | - sexual reproduction |

0 4 . 5

Mitosis occurs in the malarial protist during asexual reproduction.

The protist has 14 chromosomes.

How many chromosomes will each new protist cell have after mitosis?

[1 mark]

Tick (✓) **one** box.

7

☐

14

☒

21

☐

28

☐

Mitosis produces diploid cells and daughter cell similar to parent cell

0 4 . 6

When a person has malaria, the protists destroy red blood cells.

What change would happen in the blood of a person with malaria?

[1 mark]

Tick (✓) **one** box.

Decreased antibodies

☐

Decreased haemoglobin

☒

Increased plasma

☐

Increased platelets

☐

*- Red blood cells contain haemoglobin for transport of oxygen.
- Destruction of red blood cells decreases haemoglobin available for oxygen transport*

0 4 . 7

It is estimated that 210 million people are infected with malaria every year. Half of these infected people survive the disease.

Calculate how many people would survive the disease in 3 years if the estimate is correct.

Give your answer in standard form.

[4 marks]

$$210,000,000 \div 2 = 105,000,000 = \text{Survivors of malaria}$$

In 3 years = $105,000,000 \times 3 = 3.15 \times 10^8$ people will survive malaria.

Number of people (in standard form) = 3.15×10^8

0 4 . 8

The spread of malaria can be controlled by using mosquito nets to avoid being bitten.

Describe **two** other ways that people can reduce the chance of being bitten by mosquitos.

Do **not** refer to mosquito nets in your answer.

[2 marks]

- 1 Use insect repellent
Wear longer sleeves
- 2 Avoid places with malaria

0 4 . 9 Different types of disease may interact.

Scientists studied how having disorder **S** interacts with malaria.

The scientists calculated the chance of children with disorder **S** getting malaria.

Table 4 shows the results.

Table 4

Age in years	Percentage (%) chance of children with disorder S getting malaria
2	70
4	65
6	50
8	45

Describe the trend shown in **Table 4**.

Use data from **Table 4**.

[2 marks]

The chance of getting malaria decreases with age. At age 2, percentage chance of getting malaria is 70% and at age 8, percentage chance of getting malaria is 45%.

3. No.3

0 3

Salmonella bacteria cause outbreaks of food poisoning in humans.

To prevent food poisoning in humans, farmers vaccinate their animals against *Salmonella* bacteria.

0 3 . 1

How do *Salmonella* bacteria in food cause the symptoms of vomiting and diarrhoea?

[1 mark]

The bacteria produce toxins.

During a food poisoning outbreak, scientists identified the farm where the food came from.

The farmer had **not** vaccinated the farm animals against *Salmonella* bacteria.

0 3 . 2

The food poisoning outbreak could have been prevented if the farm animals had been vaccinated.

Explain how:

- the immune systems of animals respond to a vaccination
- the immune response in farm animals prevents an outbreak of food poisoning in humans.

[4 marks]

- Lymphocytes of farm animals produce antibodies against *Salmonella*. The antibodies produced are complimentary in shape to the antigens of *Salmonella*. So, the antibodies bind to the antigens of *Salmonella*.
- During secondary infection, antibodies are produced faster to kill the *Salmonella*. So, fewer pathogens are passed onto animal products such as eggs and meat. This makes animal products safe for human consumption.

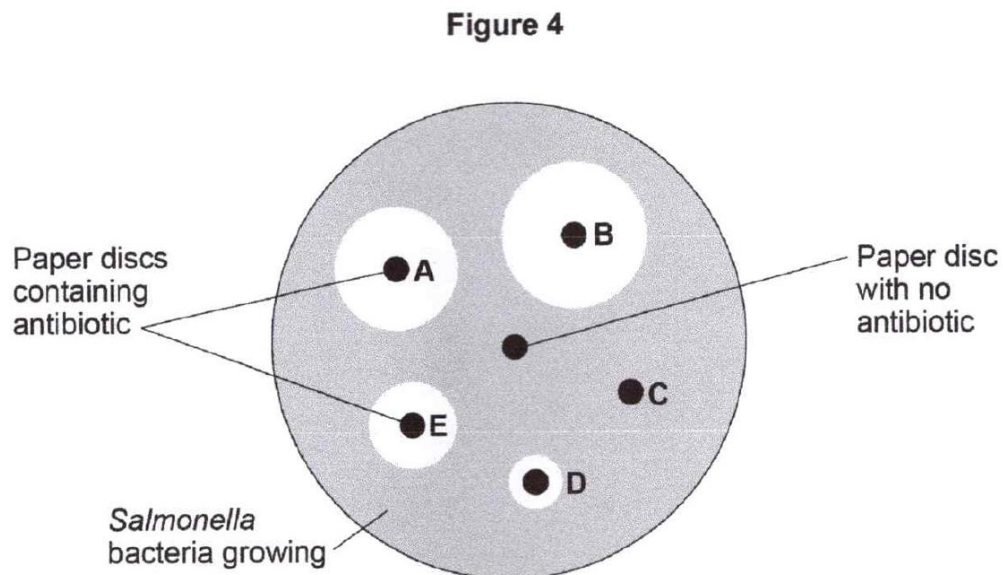
Most cases of food poisoning do **not** need to be treated with antibiotics.

However, some patients may need to take antibiotics to recover.

Scientists investigated the effectiveness of five different antibiotics on the *Salmonella* bacteria in the outbreak.

Antibiotics **A**, **B**, **C**, **D** and **E** were used in the investigation.

Figure 4 shows the results.



0 3 . 3

Describe **two** aseptic techniques the scientists should have used in the investigation.

[2 marks]

- 1 Sterilise petri-dish before use.
Sterilise agar before use.
- 2 Disinfect ^{work} surface and hands.

03.4

The scientists incubated the bacteria at 37 °C.
Students in school laboratories incubate bacteria at 25 °C.

Explain why scientists use 37 °C but students must use 25 °C to incubate bacteria.

[3 marks]

Human body has a temperature of 37°C.
Salmonella grows fast at 37°C. For incubation,
students use 25°C to reduce growth of
Salmonella because it is harmful to humans.

03.5

What is the purpose of the paper disc with no antibiotic in **Figure 4**?

[1 mark]

it acts as a control

03.6

The scientists concluded that either antibiotic **A** or antibiotic **B** should be prescribed to patients with food poisoning.

Why should antibiotic **A** or antibiotic **B** be prescribed?

[1 mark]

They killed most of the bacteria.

03.7

The scientists wanted to be more certain about which antibiotic should be prescribed.

Describe how the results in **Figure 4** could be used to obtain a **quantitative** comparison of antibiotics **A** and **B**.

[1 mark]

Measure area of each clear zone on the
paper discs.

0 3 . 8

One year later, there was another outbreak at the farm involving *Salmonella* bacteria.

Antibiotic **B** did **not** have an effect.

Suggest why antibiotic **B** no longer had an effect.

[1 mark]

The bacteria must be resistant to
antibiotic B

0 3 . 9

Antibiotics treat food poisoning because they kill *Salmonella* bacteria inside the human body.

Some antibiotics work because they damage the bacterial cell wall.

The bacteria die because the cells burst.

Explain why the cells burst.

[3 marks]

The bacterial cells absorb water by osmosis
across its selectively permeable cell membrane.
So, it swells till the cell membrane cannot
stretch any further. Then bacterial cell bursts
because it cannot withstand pressure of
water.

17