

## B5- Communicable Disease Exam Question Practice

Name:

Score:

**Q1.**

Viruses cause disease.

(a) What name is given to microorganisms that cause disease?

Tick (✓) **one** box.

Pathogens

Predators

Prokaryotes

(1)

(b) How do viruses cause the symptoms of disease?

Tick (✓) **one** box.

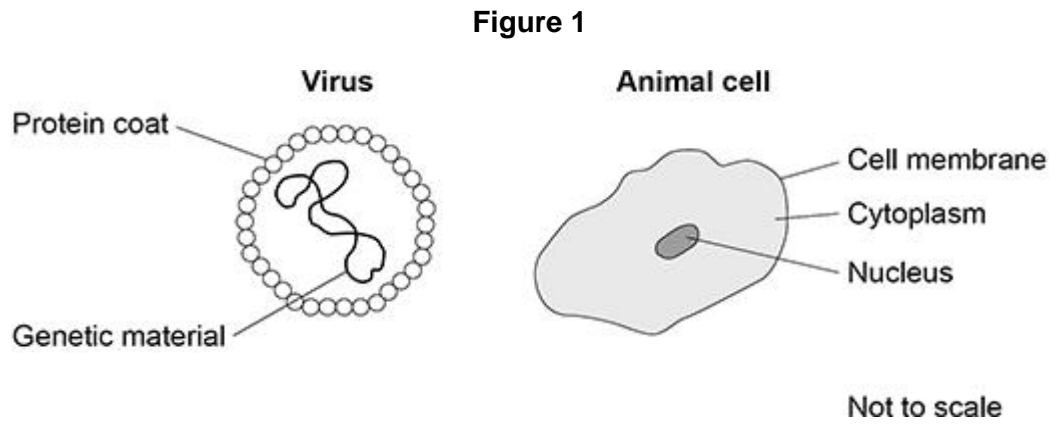
Viruses engulf white blood cells,  
destroying them.

Viruses produce antibodies that  
damage tissues.

Viruses reproduce inside cells,  
damaging them.

(1)

**Figure 1** shows a virus and an animal cell.



(c) Suggest **one** reason why viruses are **not** classed as cells.

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(1)

A vaccine can protect humans from a viral disease.

(d) What does the vaccine contain?

Tick (✓) **one** box.

A toxic form of a virus

A weakened form of a virus

An active form of a virus

(1)

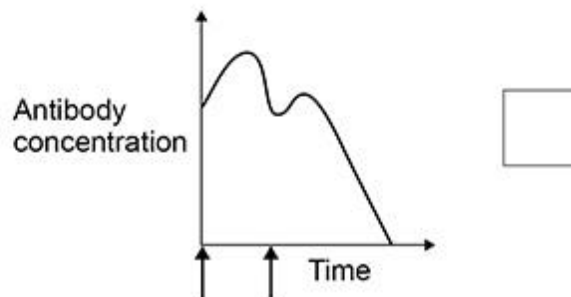
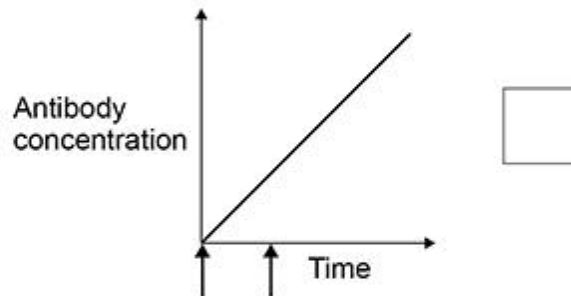
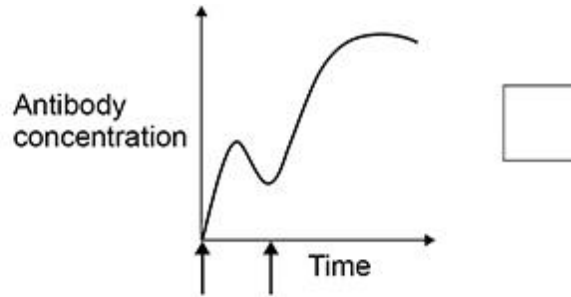
In some cases, a first vaccination needs to be followed by a second vaccination sometime later.

- (e) Which graph shows how the concentration of antibodies in a person's blood changes after the first and second vaccinations?

Tick (✓) **one** box.

**Key**

↑ Vaccination given



(1)

Tobacco mosaic virus (TMV) causes disease in plants.

TMV affects the rate of photosynthesis in plants.

- (f) Which part of a plant shows discolouration caused by TMV?

Tick (✓) **one** box.

Flower

Leaf

Root



(1)

The table below shows the rate of photosynthesis in four different tobacco plants.

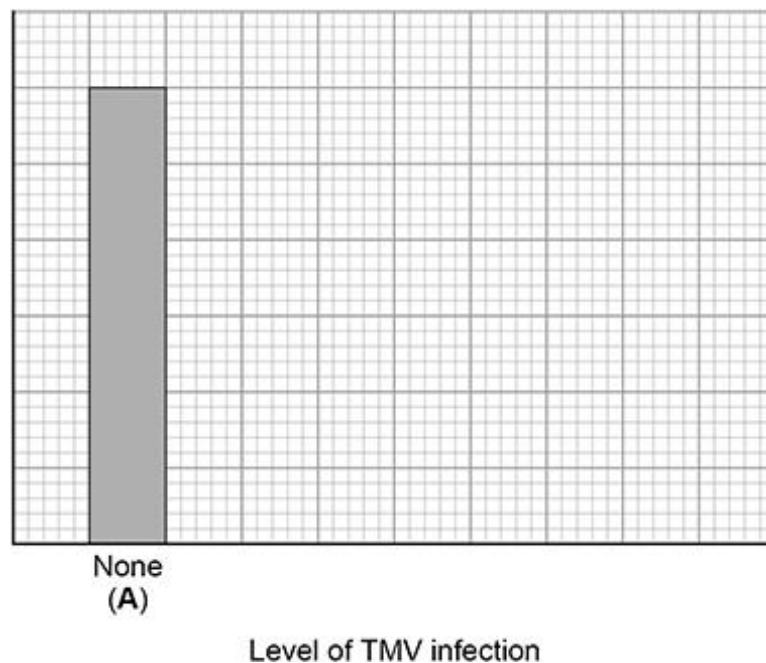
Tobacco plant	Level of TMV infection in plant	Rate of photosynthesis in arbitrary units
A	None	15
B	Mild	13
C	Medium	7
D	High	3

(g) Complete **Figure 2**.

You should:

- label the y-axis
- add the correct scale to the y-axis
- plot the data from the table above
- label each bar.

**Figure 2**



(5)

(h) What conclusion can be made from the data in the table above?

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(1)

(i) Explain why a high level of TMV infection reduces growth in a plant.

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(2)

(Total 14 marks)

**Q2.**

Tobacco mosaic virus (TMV) is a disease affecting plants.

The diagram below shows a leaf infected with TMV.



Yellow patches where  
TMV has destroyed  
chloroplasts

© Nigel Cattlin/Visuals Unlimited/Getty Images

(a) All tools should be washed in disinfectant after using them on plants infected with TMV.

Suggest why.

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(1)

(b) Scientists produced a single plant that contained a TMV-resistant gene.

Suggest how scientists can use this plant to produce **many** plants with the TMV-resistant gene.

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(1)

(c) Some plants produce fruits which contain glucose.

Describe how you would test for the presence of glucose in fruit.

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(2)

(d) TMV can cause plants to produce less chlorophyll.

This causes leaf discoloration.

Explain why plants with TMV have stunted growth.

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(4)

(Total 8 marks)

**Q3.**

In the 1800s, many women died from disease after giving birth.

Dr Semmelweis compared the death rates of women in two hospital wards, **Ward A** and **Ward B**.

**Table 1** shows some of the results.

**Table 1**

Year	Percentage (%) of women who died	
	Ward A	Ward B
1834	7.7	7.4
1836	7.5	7.8
1844	8.4	2.1
1846	11.3	2.8

**Before 1840**

Doctors and nurses worked in **Ward A** and in **Ward B**.

The doctors often worked in other wards with patients who had diseases.

The doctors did **not** wash their hands.

**After 1840**

Doctors only worked in **Ward A** and **not** in **Ward B**.

Only nurses worked in **Ward B**.

The nurses did **not** work in other wards with patients who had diseases.

- (a) (i) Look at the data for **Ward A** and **Ward B** after 1840.

Describe the effect on death rate of having **only** nurses working in **Ward B** and **not** doctors.

To gain full marks you must refer to the data in **Table 1**.

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(2)

- (ii) Suggest an explanation for the difference you described in part (a)(i).

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(2)

- (b) In 1847, Dr Semmelweis told the doctors to wash their hands each time before they began to work in **Ward A**.

**Table 2** shows the death rates in the two wards, after 1847.

**Table 2**

Year	Percentage (%) of women who died	
	Ward A	Ward B
1848	2.7	2.8
1849	2.0	1.9

Dr Semmelweis was right to tell the doctors to wash their hands.

What evidence is there to support Dr Semmelweis telling the doctors to wash their hands?

Use information from **Table 1** and **Table 2** in your answer.

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(3)

- (c) In modern hospitals less than 0.1% of women die from disease after giving birth.

Medical understanding has improved since the 1850s to reduce the death rate.

Other than improvements in hygiene, give **two** reasons for the low death rate from infectious diseases in modern hospitals.

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(2)

(Total 9 marks)



## Combined Higher Questions:

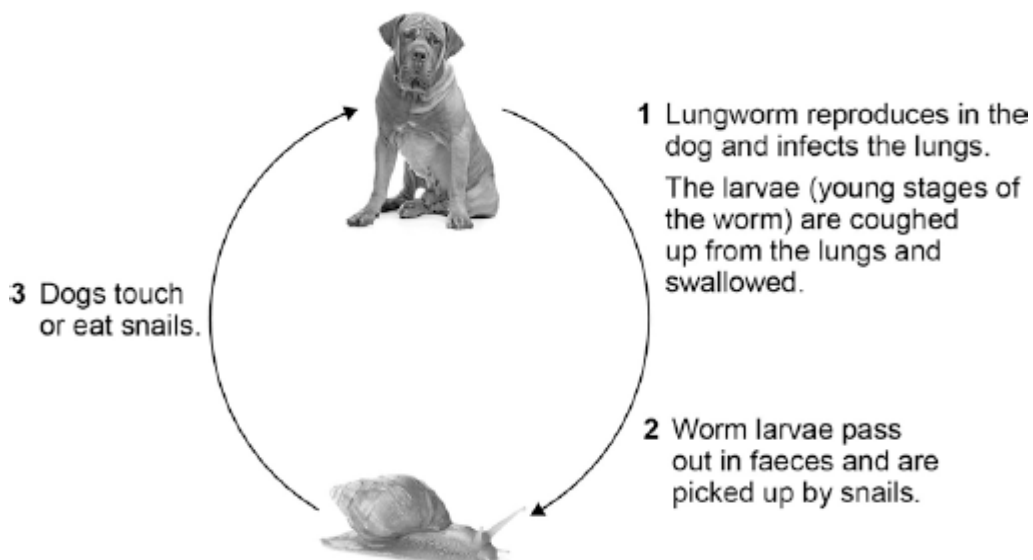
### Q4.

Lungworm is an infection.

Lungworm can kill dogs.

It is caused by a small worm.

The diagram below shows the lifecycle of the lungworm.



Dog © Eriklam/iStock/Thinkstock, snail © Karandaev/iStock/Thinkstock

(a) What type of organism is represented by the snail in the lifecycle of the lungworm?

Tick **one** box.

Fungus

Parasite

Protist

Vector

(1)

(b) Suggest how the spread of the lungworm disease can be prevented.

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(3)

(c) Malaria is a disease spread by mosquitoes.

Describe **two** ways to control the spread of malaria.

1. \_\_\_\_\_

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2. \_\_\_\_\_

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(2)

(Total 6 marks)

**Q5. Triple Only**

Many plants have evolved defence mechanisms.

**Figure 1** shows part of a gorse plant and part of a deadly nightshade plant.

**Figure 1**



(a) The gorse plant has evolved to have sharp thorns.

What type of defence response are thorns?

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(1)

(b) How do thorns defend the gorse plant?

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(1)

(c) The deadly nightshade plant has poisonous berries.

What type of defence response are poisonous berries?

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(1)

- (d) A scientist noticed that in one area the gorse plants had yellow leaves and had stunted growth.

One reason for yellow leaves and stunted growth is a deficiency of nitrate ions in the soil.

Explain **two** other possible reasons for the yellow leaves and stunted growth.

Do **not** refer to nitrate ions in your answer.

Reason 1

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Explanation

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Reason 2

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Explanation

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(5)

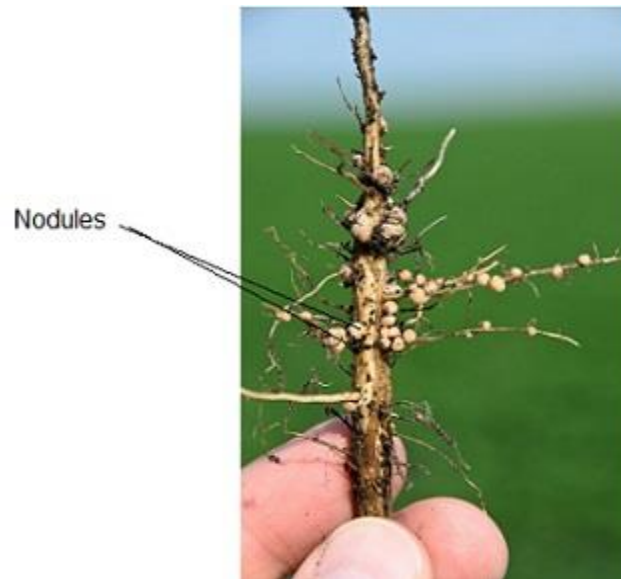
The gorse plant has nodules on its roots.

The nodules are part of the living root tissue.

Bacteria which convert nitrogen gas into soluble nitrate ions live in the nodule tissue.

**Figure 2** shows the nodules on the roots.

**Figure 2**



(e) Suggest how the nodules benefit the bacteria.

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(2)

(f) Explain how the nodules benefit the gorse plant.

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(2)

(g) For many years drugs have been extracted from plants.

Which plant material was chewed as a painkiller?

Tick (✓) **one** box.

Blackcurrant berries

Foxglove leaves

Rose petals

Willow bark

(1)  
(Total 13 marks)

## Mark schemes

### Q1.

- (a) pathogens 1
- (b) viruses reproduce inside cells, damaging them 1
- (c) any **one** from:
- they do not have a cell membrane  
*do not accept they do not have a cell wall*
  - they do not have cytoplasm
  - they do not have a nucleus
  - they do not have mitochondria (like most eukaryotic cells)
  - they do not have ribosomes  
*do not accept they do not have chloroplasts / chlorophyll*  
*ignore they are not living / alive*  
*ignore they can only replicate inside cells*  
*ignore virus has a protein coat*
- 1
- (d) a weakened form of a virus 1
- (e)
- 
- 1
- (f) leaf 1
- (g) y-axis labelled rate of photosynthesis in arbitrary units 1
- correct scale 1
- all bars plotted correctly  
*allow a tolerance of  $\pm \frac{1}{2}$  small square*  
*allow 2 correct bars for 1 mark*  
*allow bars touching*  
*allow any width of bars* 2
- all bars correctly labelled

*ignore letters*

1

- (h) as the level of infection (with TMV) increases, (the rate of) photosynthesis decreases

*allow as TMV increases, photosynthesis decreases*

*allow (the rate of) photosynthesis decreases as the level of infection (with TMV) increases*

*allow as infection gets worse, photosynthesis decreases*

*allow TMV reduces photosynthesis*

1

- (i) less chlorophyll

*allow fewer chloroplasts*

*allow less light absorbed*

*ignore less photosynthesis*

1

(so) less glucose / starch / protein made

1

[14]

## Q2.

- (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]

**Q3.**

- (a) (i) lower percentage (of women) who died  
*allow fewer (women) died*

1

numerical reference to a pair of figures to show this  
*allow any difference in a pair of figures*

1

- (ii) doctors were not transferring  
*ignore reference to nurses*

1

pathogens / bacteria / viruses / microorganisms / microbes  
*allow fungi*  
*ignore disease / germs / infection*

1

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

- lower percentage of patients died (when doctors washed hands or in ward A)  
*allow fewer for lower percentage*
- large decrease or reference to proportional decrease  
*ignore raw data*
- little / no difference / similar to ward B
- continued drop (in ward A)

3

- (c) any **two** from:

- better understanding / knowledge of immunity  
*accept ref to immunisation / vaccination*
- better / new drugs  
*accept examples, e.g. antibiotics / penicillin (discovered)*  
*allow better / new medicines*
- sterilisation of equipment **or** isolation of patients **or** some infectious diseases wiped out **or** earlier identification / treatment of infections  
*ignore references to general hygiene*

2

[9]



## Combined Higher Mark Scheme:

- (a) vector 1
- (b) any **three** from:
- destroy the snails
  - isolate infected dogs
  - treat infected dogs  
*allow vaccination*
  - educate owners about picking up dog faeces 3
- (c) stop mosquitoes breeding 1  
*allow correct description*
- use mosquito nets 1  
*allow use of insect repellent*
- [6]

## Triple only.

- (a) mechanical 1  
*allow physical*  
*allow structural*
- (b) any **one** from:
- to deter herbivores  
*ignore to injure animals, unqualified*  
*allow to deter animals eating it*  
*do **not** accept to deter predators*
  - to prevent animals damaging it 1
- (c) chemical 1
- (d) any **two** from :
- lack of magnesium (ions) (1)  
  
(so) not enough chlorophyll for (efficient) photosynthesis (1)  
  
(so) not enough glucose to make proteins for growth  
**or** not enough glucose to release energy for growth (1)  
*allow (so) lack of chlorophyll produced causes yellow leaves (1), (so) not enough photosynthesis to produce glucose which is used to make proteins for growth (1)*
  - infection by pathogen / bacteria / virus / fungus (1)  
*allow correctly named pathogen*  
*allow has rose black spot / TMV*

(so) leaves become discoloured / yellow so less photosynthesis (1)

*allow other symptoms of named pathogens / disease*

(so) not enough glucose to make proteins for growth **or** not enough glucose to release energy for growth (1)

*award once only*

- infected by aphids (1)

(which) remove sugars from phloem (1)

(so) not enough glucose to make proteins for growth **or** not enough glucose to release energy for growth (1)

*award once only*

- lack of (available) light (1)

(so) chlorophyll breaks down (1)

(so) not enough glucose to make proteins for growth **or** not enough glucose to release energy for growth (1)

*award once only*

5

- (e) (bacteria) obtain glucose / sugar (from the plant)

1

(glucose used) for respiration **or** (glucose used) for making other named substances

*allow (glucose used) to release energy*

1

- (f) (gorse plant) obtains nitrate (ions)

1

needed for amino acids / proteins

*allow needed to make chlorophyll / DNA*

1

- (g) willow bark

1

[13]