# 1.17 Communicable Diseases and Pathogens: 30-minute Pack

Total Marks

AQA 8464 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** Antibiotics are used to treat bacterial infections but do not work on viruses.

**(a)** Explain why antibiotics can treat bacterial infections but are ineffective against viruses. **(3)**

**(Total for Question 1 is 3 marks)**

**2** A local clinic tests 240 patients for infection X. 48 patients test positive. Determine the prevalence.

**(a)** Calculate the prevalence of infection X in this sample as a percentage. Give the answer to 1 decimal place. **(3)**

**(Total for Question 2 is 3 marks)**


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**3** Investigating plant disease involves comparing infected and uninfected plants.

**(a)** Suggest two controlled variables that should be kept the same when comparing growth of infected and uninfected plants in an experiment, and explain why each should be controlled. **(3)**

**(Total for Question 3 is 3 marks)**

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**4** Rose black spot is a fungal disease that affects the leaves of rose plants.

**(a)** State the type of pathogen that causes rose black spot. **(1)**

**(b)** Describe two symptoms of rose black spot on a rose plant. **(2)**

**(c)** Explain how the loss of leaves caused by rose black spot can reduce a rose plant's growth. **(2)**

**(d)** Give two ways a gardener could try to control the spread of rose black spot. **(2)**

**(Total for Question 4 is 7 marks)**


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**5** Before treating a plant, a gardener or farmer needs to identify whether it has a communicable disease.

**(a)** Give two visible signs that could suggest a plant is diseased. **(2)**

**(b)** Give two ways, other than sending a sample away to a laboratory, that a gardener could find out what is causing a disease in a plant. **(2)**

**(c)** A field of wheat plants shows patches of stunted, discoloured plants. Explain how looking at the distribution pattern of the affected plants across the field could help a farmer work out whether the cause is a communicable pathogen or a mineral ion deficiency in the soil. **(3)**

**(Total for Question 5 is 7 marks)**


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# Mark scheme · 1.17 Communicable Diseases and Pathogens: 30-minute Pack

## Question 1

(a) antibiotics target features of bacterial cells such as cell wall synthesis or protein synthesis machinery **M1**

(a) viruses lack these bacterial structures and replicate inside host cells using host machinery **M1**

(a) therefore antibiotics cannot target viruses without harming host cells cao **A1**

**(a) Answer: Antibiotics target bacterial cell features like cell wall or protein synthesis; viruses lack these structures and replicate inside host cells using host machinery, so antibiotics cannot target viruses without harming host cells.**

## Question 2

(a) method: percentage = (number positive / total) x 100, substitutes 48/240 x 100 **M1**

(a) 20.0% cao **A1**

(a) answer given to 1 decimal place or justified rounding **A1**

**(a) Answer: 20.0%**

## Question 3

(a) states one controlled variable such as light intensity, temperature, water, soil type, or plant age **M1**

(a) states a second controlled variable **M1**

(a) gives reasons linking control to fair comparison, eg same light and water so differences are due to infection **A1**

**(a) Answer: Any two controlled variables, e.g. light intensity and watering amount. Control them so that any difference in growth is due to infection not different light or water.**

## Question 4

(a) fungus cao **B1**

**(a) Answer: Fungus.**

(b) purple or black spots/patches appear on the leaves, oe **B1**

(b) the leaves surrounding the spots often turn yellow and drop off (fall) early, oe **B1**

**(b) Answer: Purple or black spots appear on the leaves, and the leaves often turn yellow and drop off early.**

(c) losing leaves reduces the surface area/amount of chlorophyll available for photosynthesis, oe **B1**

(c) this reduces the amount of glucose produced, so less energy/fewer new materials are available for growth, so the plant grows less (is stunted), oe **B1**

**(c) Answer: Losing leaves reduces the surface area available for photosynthesis, so less glucose is made. This means less energy and fewer new materials are available for growth, so the plant grows less.**

(d) spray/treat the plant with a fungicide, oe **B1**

(d) remove and destroy (e.g. burn) infected leaves promptly, rather than leaving them to fall and decay near the plant, oe **B1**

**(d) Answer: Any two of: spray with a fungicide; remove and destroy infected leaves promptly; avoid overhead watering that splashes spores between plants.**

## Question 5

(a) stunted growth, oe **B1**

(a) spots on the leaves, patches of decay, malformed stems or leaves, growths, discolouration (e.g. yellowing), or the presence of pests, oe **B1**

**(a) Answer: Any two of: stunted growth; spots on leaves; patches of decay; malformed stems or leaves; growths; discolouration (e.g. yellowing); presence of pests.**

(b) use a gardening manual or reference guide to compare the symptoms with pictures/descriptions of known plant diseases, oe **B1**

(b) use an online database/website of common plant diseases, or use a testing kit (e.g. one that uses monoclonal antibodies) to identify a specific pathogen from a sample, oe **B1**

**(b) Answer: Any two of: use a gardening manual or reference guide with pictures of infected plants; use an online database of common plant diseases; use a testing kit that identifies a pathogen using monoclonal antibodies.**

(c) if the affected plants are randomly scattered or found in patches that grow larger over time, this suggests a communicable pathogen, since disease spreads outward from an initial point of infection or is carried between plants (e.g. by wind, water or insects), oe **B1**

(c) if the affected plants are found evenly across a distinct area of the field (e.g. matching a particular soil type or drainage pattern), this suggests a non-communicable cause such as a mineral ion deficiency, since this is not spread from plant to plant, oe **B1**

(c) comparing the pattern seen in the field to these two possibilities allows the farmer to narrow down the likely cause before testing further, oe **B1**

**(c) Answer: A random or spreading, patchy distribution suggests a communicable pathogen, since disease spreads outward from infected plants or is carried between them. An even distribution linked to a particular area of soil suggests a non-communicable cause, such as a mineral ion deficiency, since this does not spread plant to plant.**


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