

Past-paper walk-through

Diseases and immunity ■ 10.1

eXercise

Questions in this set

- 0610/21 N25 Q14 ■ 1 mark
- 0610/21 N25 Q16 ■ 1 mark
- 0610/22 N25 Q15 ■ 1 mark
- 0610/22 N25 Q22 ■ 1 mark
- 0610/23 N25 Q17 ■ 1 mark
- 0610/21 J25 Q16 ■ 1 mark
- 0610/21 J25 Q17 ■ 1 mark
- 0610/22 J25 Q19 ■ 1 mark
- 0610/43 J25 Q5 ■ 13 marks
- 0610/22 M25 Q17 ■ 1 mark

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 14

0610/21 N25 ■ Q14 ■ 1 mark

14 Which statements are correct descriptions of methods of preventing pathogens from entering the body?

- 1 Fibrin is converted to fibrinogen to form a mesh.
- 2 Phagocytes produce antibodies.
- 3 Platelets clot blood.
- 4 Lymphocytes engulf pathogens.

A 1, 3 and 4

B 1 and 3 only

C 2 and 4

D 3 only

Solution 14

Answer: **D**

Why

- Fibrinogen is converted to fibrin, not the other way round – statement 1 is reversed.
- Phagocytes engulf pathogens; it is *lymphocytes* that make antibodies – statement 2 is wrong.
- The genuine barriers are the skin, mucus, hairs in the nose and clotting at a wound.

Question 16

0610/21 N25 ■ Q16 ■ 1 mark

16 Three statements about immunity are listed.

- 1 Specific antibodies are produced in response to specific antigens.
- 2 Pathogens have specific antigens.
- 3 A vaccination stimulates an immune response.

Which statements are correct?

- A** 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 2 and 3 only

Solution 16

Answer: **A**

Why

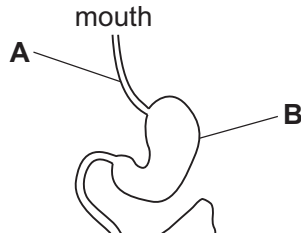
- Each pathogen carries its own specific antigens – statement 2.
- Lymphocytes make antibodies with a complementary shape to those antigens – statement 1.
- A vaccine contains the antigen in a harmless form, so it triggers the same response – statement 3.

Question 15

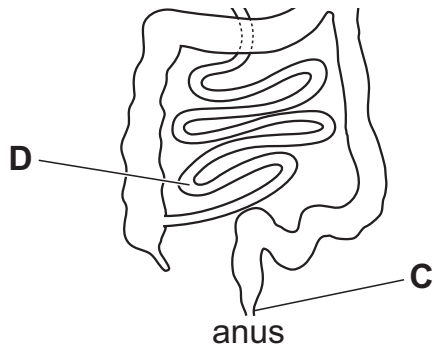
0610/22 N25 ■ Q15 ■ 1 mark

15 The diagram shows the human digestive system.

Where do cholera bacteria cause the secretion of chloride ions?



Question 15



Solution 15

Answer: **D**

Why

- Cholera bacteria act on the lining of the small intestine.
- They release a toxin that makes those cells secrete chloride ions.
- Water then follows by osmosis, causing severe watery diarrhoea.

Question 22

0610/22 N25 ■ Q22 ■ 1 mark

22 Which action would help to limit the development of antibiotic resistance in bacteria?

- A** Use antibiotics frequently to prevent infection by antibiotic-resistant bacteria.
- B** Use antibiotics only to treat bacterial infections.
- C** Use antibiotics to treat all types of infections.
- D** Use antibiotics to treat only viral infections.

Solution 22

Answer: **B**

Why

- Resistance spreads because using an antibiotic kills the sensitive bacteria and spares the resistant ones.
- So using antibiotics less often, and only when they are really needed, slows that selection.
- Completing every prescribed course also matters, so no partly-resistant survivors are left behind.

Question 17

0610/23 N25 ■ Q17 ■ 1 mark

17 What is an example of active immunity?

- A** antibody production after infection
- B** antibody transfer from mother to baby in breast milk
- C** antibody transfer from mother to fetus across the placenta
- D** an injection of antibodies that were produced by another individual

Solution 17

Answer: **A**

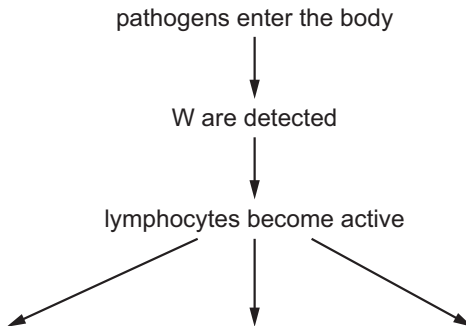
Why

- Active immunity means the person's own lymphocytes make the antibodies.
- Producing antibodies after an infection is exactly that.
- Antibodies received in milk or across the placenta were made by the mother, so that is *passive*.

Question 16

0610/21 J25 ■ Q16 ■ 1 mark

16 The diagram shows what happens in the body during active immunity.



Question 16

X destroy
pathogens directly

marking of pathogens
occurs so that they
can be destroyed by Y

Z are produced for
long-term immunity

Which structures or cells represent W, X, Y and Z?

	antibodies	antigens	memory cells	phagocytes
A	W	X	Y	Z
B	W	X	Z	Y
C	X	W	Y	Z
D	X	W	Z	Y

Solution 16

Answer: **D**

Why

- Active immunity means the person's *own* lymphocytes respond.
- The pathogens' antigens are detected, and lymphocytes are activated.
- They then make antibodies that mark the pathogens for destruction, plus memory cells for the future.

Question 17

0610/21 J25 ■ Q17 ■ 1 mark

- 17** Cholera is a disease caused by a bacterium called *Vibrio cholerae* which produces a toxin in the infected person's gut.

What is the effect of this toxin?

- A** The toxin causes loss of water from the gut into the blood.
- B** The toxin causes loss of water from the gall bladder into the blood.
- C** The toxin causes water to enter the gut from the blood.
- D** The toxin causes water to enter the gall bladder from the blood.

Solution 17

Answer: **C**

Why

- The cholera toxin acts on the cells lining the small intestine.
- It makes them secrete chloride ions, so water follows out of the blood by osmosis.
- The result is severe watery diarrhoea and dehydration.

Question 19

0610/22 J25 ■ Q19 ■ 1 mark

19 Three statements about immunity are listed.

- 1 The transfer of antibodies from mother to baby in breast milk is an example of passive immunity.
- 2 Passive immunity results in long-term immunity because of the production of memory cells.
- 3 Active immunity is gained after vaccination with antigens.

Which statements are correct?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

Solution 19

Answer: **C**

Why

- Antibodies passed in breast milk were made by the mother, so the baby's immunity is *passive* – statement 1 is right.
- Passive immunity is short-lived, because no memory cells are made, so statement 2 is wrong.
- Only active immunity, from infection or vaccination, gives long-term protection.

Question 5

0610/43 J25 ■ Q5 ■ 13 marks

5 Penicillin is an antibiotic.

(a) (i) State the type of organism that antibiotics are used to kill.

Question 5

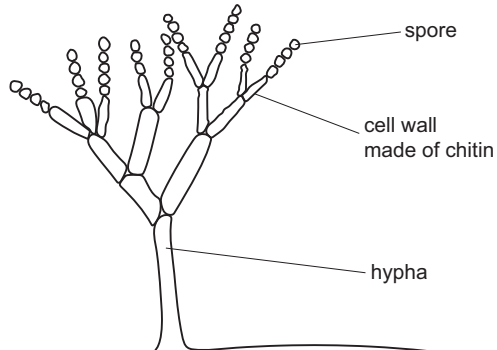
- (ii) It is important to try and limit the development of antibiotic resistance.

Describe ways of limiting the development of antibiotic resistance.

Question 5

(b) Penicillin is produced by an organism called *Penicillium chrysogenum*.

Fig. 5.1 is a diagram of *Penicillium chrysogenum*.



Question 5



Fig. 5.1

- (i) State what *Penicillium* in the scientific name of *Penicillium chrysogenum* represents in the binomial system.

Question 5

- (ii) Using the information in Fig. 5.1, identify the kingdom that contains *Penicillium chrysogenum*.

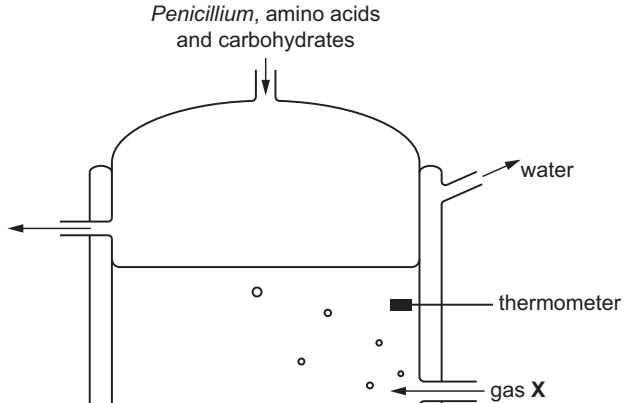
Question 5

(c) Penicillin can be made in a fermenter.

(i) State the name of **one other** product made in a fermenter.

Question 5

Fig. 5.2 shows a fermenter.



Question 5

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Question 5

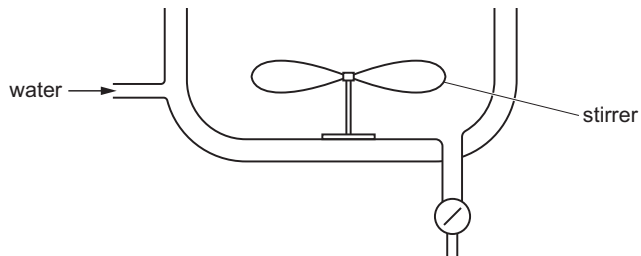


Fig. 5.2

- (ii) Gas **X** in Fig. 5.2 is needed for the production of penicillin.

State the name of gas **X**.

Question 5

- (iii) The concentration of gas **X** is one of the conditions that must be controlled to ensure that penicillin is produced.

State the **other** conditions required to produce penicillin **and** describe how they are controlled in the fermenter.

Question 5

(d) State the name of the organism that is used in bread-making **and** in biofuel production.

Question 5

[Total: 13]

Solution 5

(a)(i)

Mark scheme

- bacteria / prokaryote(s) ;
- 1

Solution 5

(a)(ii) Mark scheme

- any two from:
- only use for bacterial infections / when essential / when necessary ;
- use appropriate antibiotic ;
- AVP ;
- 2
- e.g. complete the course / shorter course /
- reduce use in livestock / take the full dose /
- do not share antibiotic

Solution 5

(b)(i)

Mark scheme

- genus ;
- 1

(b)(ii)

Mark scheme

- fungus / fungi ;
- 1

Solution 5

(c)(i)

Mark scheme

- insulin / mycoprotein / ethanol / (named) alcohol / carbon dioxide / amino acids /
- hormones / proteins / factor VIII / AVP ;
- 1

Solution 5

(c)(ii)

Mark scheme

- oxygen ;
- 1
- 0610/43
- May/June 2025
- Guidance

Solution 5

(c)(iii) Mark scheme

- any five from:
- 1
- monitoring ;
- 2
- temperature ;
- 3
- water jacket / described / water bath ;
- 4

Solution 5

- pH ;
- 5
- carbon dioxide might reduce pH ;
- 6
- buffer / described ;
- 7
- keep, pH / temperature, at suitable value for enzyme activity ;
- 8
- (named) nutrient supply ;
- 9

Solution 5

- carbon dioxide / waste products, removal ;
- 10 stirrer to equally (distributed), temperature / pH / nutrient concentration /
- oxygen concentration / microorganisms ;
- 11 idea of regulating (gas) pressure ;
- 12 vent or exhaust ;
- 13 sealed to prevent contamination / AW ;
- 5

Solution 5

(d)

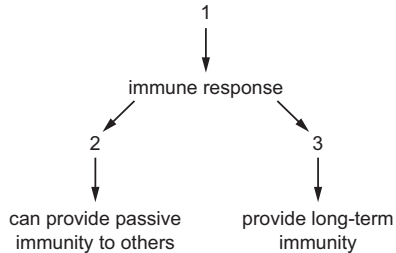
Mark scheme

- yeast ;
- 1
- 0610/43
- May/June 2025
- Guidance

Question 17

0610/22 M25 ■ Q17 ■ 1 mark

- 17** The diagram shows the effect of vaccination on the human body. Three components in the diagram are represented by numbers.



Which components are memory cells?

Question 17

- A** 1 only **B** 2 and 3 **C** 2 only **D** 3 only

Solution 17

Answer: **D**

Why

- Vaccination introduces a harmless form of the antigen, which triggers the immune response.
- Active lymphocytes make antibodies and memory cells.
- Antibodies given to someone else would provide *passive* immunity, since that person made none of their own.