

Health, disease and the development of medicines practice questions

17 questions • 48 marks • mark scheme at the back

For Edexcel GCSE Combined Science 1SC0. **Higher tier** is only on the Higher paper.

Name

Total / 48

Health and disease Spec 5.1-5.3

1 Which statement matches the World Health Organization (WHO) definition of health? [1 mark]

- A. ☐ The absence of disease or infirmity
- B. ☐ A state of complete physical, mental and social well-being
- C. ☐ Being physically fit and able to exercise
- D. ☐ Having a healthy diet and not smoking

2 Describe the difference between a communicable disease and a non-communicable disease. [2 marks]

3 People with HIV are more likely to develop tuberculosis (TB). Explain why. [3 marks]

4 A study of 500 people found that those with a long-term skin condition had more infections than those without. A student says that the skin condition causes the infections. Give one reason why the student may be right and one reason why the conclusion cannot be certain. [2 marks]

Pathogens and infections Spec 5.4–5.8

5 Which disease is caused by a protist? [1 mark]

- A. ☐ Cholera
- B. ☐ Malaria
- C. ☐ Tuberculosis
- D. ☐ Chalara ash dieback

6 Cholera is caused by bacteria. Explain how cholera is spread and how its spread can be reduced. [3 marks]

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7 Chlamydia is a sexually transmitted infection (STI). Explain how its spread can be reduced. [3 marks]

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8 Chalara ash dieback is a disease of ash trees caused by a fungus. (a) State two effects of the disease on an ash tree. (2) (b) Describe how the disease spreads and give one way of reducing its spread. (2) [4 marks]

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Human defences and immunity

9 Describe how the nose and airways help to prevent pathogens reaching the lungs. **[3 marks]**

[illegible]

10 A child has chickenpox once and does not usually become ill with it again. Explain why the child does not become ill if they are infected with the chickenpox virus a second time. **[3 marks]**

[illegible]

11 Explain how the immune system responds when a pathogen enters the body for the first time, and how immunisation can prevent illness when the same pathogen enters the body again. **[6 marks]**

[illegible]

Antibiotics, culturing microorganisms and new medicines

12 Why can antibiotics not be used to treat a viral disease? [1 mark]

- A. ☐ Viruses are too large to be affected
- B. ☐ Viruses reproduce too quickly for antibiotics to act
- C. ☐ Viruses live inside host cells and do not have the bacterial cell processes that antibiotics inhibit
- D. ☐ Viruses have a cell wall that antibiotics cannot pass through

13 Describe the stages in the development of a new antibiotic, in the correct order. **[3 marks]**

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Non-communicable diseases Spec 5.23-5.25

14 Which statement about non-communicable diseases is correct? **[1 mark]**

- A . ☐ They are caused by a single factor
- B . ☐ They are often caused by the interaction of a number of factors
- C . ☐ They are spread by vectors
- D . ☐ They are caused by pathogens

15 The table shows some measurements for a man. (a) Calculate his body mass index (BMI). **[3 marks]**
Use the equation: $BMI = \text{mass (kg)} \div \text{height (m)}^2$. Give your answer to 1 decimal place. (2)
(b) Calculate his waist : hip ratio. Give your answer to 2 decimal places. (1)

Measurements for one man	
Measurement	Value
Mass	85 kg
Height	1.70 m
Waist circumference	98 cm
Hip circumference	104 cm

Answer =

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16 (a) Describe how smoking increases the risk of cardiovascular disease. (2) (b) State one disease caused by drinking too much alcohol. (1) **[3 marks]**

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17 Doctors can treat cardiovascular disease with life-long medication, with surgical procedures, or by advising lifestyle changes. Evaluate these three treatments.

[6 marks]

[illegible]

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

B B (1)

2. [2]

- a communicable disease can be passed from one organism to another / is caused by a pathogen (1)
allow infectious
- a non-communicable disease cannot be passed on / is not caused by a pathogen (1)

3. [3]

- HIV destroys white blood cells (1)
- so the immune system is weakened / fewer antibodies are made (1)
- so the bacteria that cause TB are not destroyed / the body cannot fight the infection (1)

4. [2]

- the damaged skin is a weaker barrier / allows pathogens to enter (1)
- a correlation does not prove cause / another factor could explain both / the sample may not be representative (1)

5. [1]

B B (1)

6. [3]

- bacteria are in water contaminated with sewage / faeces (1)
- people become infected by drinking the contaminated water (1)
- provide clean / treated drinking water or treat sewage (1) allow handwashing / thorough cooking of food

7. [3]

- use a condom (1)
- which acts as a barrier / stops the bacteria passing between partners (1)
- regular screening / testing and treating infected people with antibiotics (1)
- limit the number of sexual partners / inform partners so they can be tested (1) allow abstaining from sex
- Max 3

8. [4]

- (a) leaf loss (1)
- bark lesions (1)
- (b) spores are carried in the air / by the wind (1)
- destroy infected trees / restrict the movement or import of ash plants (1)

9. [3]

- mucus traps pathogens (1)
- cilia (hairs) on the cells lining the airways (1)
- move the mucus away from the lungs / up to the throat (1)

10. [3]

- memory lymphocytes were made during the first infection (1)
- they recognise the antigens and respond faster (1)
- more antibodies are made quickly so the pathogen is destroyed before symptoms develop (1)

11. [6]

Level 3 5-6	A clear, well-structured explanation covering both the first response (antigens, antibodies, memory lymphocytes) and how immunisation leads to a faster, larger secondary response. Scientific terms are used accurately and links between ideas are clear.
Level 2 3-4	Explains most of the first response or immunisation, with some correct links. There may be gaps, such as not linking memory lymphocytes to the secondary response.
Level 1 1-2	Some correct statements about antibodies or immunisation, but little explanation and few links between ideas.

Indicative content

- antigens on the pathogen trigger an immune response
- the response produces antibodies that bind to the antigens and help to destroy the pathogen
- antigens also trigger production of memory lymphocytes
- immunisation uses an inactive form of the pathogen, which cannot cause the disease
- the inactive pathogen still has antigens, so antibodies and memory lymphocytes are produced
- if the live pathogen enters later, memory lymphocytes carry out a secondary response
- this is faster and produces more antibodies, so the pathogen is destroyed before the person becomes ill

12. [1]**C C (1)****13. [3]**

- discovery of the chemical (1)
- development (1)
- preclinical testing, on cells, tissues and live animals (1)
- clinical testing on people (1)
- Max 3

14. [1]**B B (1)****15. [3]**

- (a) $\text{height}^2 = 1.70 \times 1.70 = 2.89$ (1)
- $\text{BMI} = 85 \div 2.89 = 29.4$ (1) allow 29.41; award 2 marks for the correct answer with no working
- (b) $98 \div 104 = 0.94$ (1) allow 0.942; do not accept a unit

16. [3]

- (a) chemicals in smoke damage the lining of arteries, so fatty deposits build up / arteries narrow (1)
- nicotine increases heart rate and blood pressure (1) allow any other correct effect on the heart or blood vessels
- (b) liver disease / cirrhosis / fatty liver (1)

17. [6]

Level 3 5-6	A balanced evaluation of all three treatments, with advantages and disadvantages for each, and a justified conclusion about their use.
Level 2 3-4	Advantages and/or disadvantages given for at least two treatments, with some judgement. The conclusion may be missing or not justified.
Level 1 1-2	A few correct points about one or two treatments, with no evaluation or conclusion.

Indicative content

- medication such as statins or blood pressure drugs reduces risk without an operation
- but medication must be taken for life, can have side effects and costs money
- surgery such as stents, bypass, valve replacement or transplant can quickly restore blood flow or heart function
- but surgery has risks such as infection and bleeding, needs recovery time and is expensive; a transplant needs a donor and may be rejected
- lifestyle changes such as stopping smoking, healthy diet and exercise are cheap, have no side effects and reduce risk
- but they need long-term effort, take time and may not be enough for severe disease
- conclusion, for example lifestyle changes for everyone, medication to manage disease, and surgery for severe blockages