PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

# BIOLOGY



## EXAM QUESTION PACK

TOPIC 5: HEALTH, DISEASE AND THE DEVELOPMENT OF MEDICINES (PAPER 1, PACK 2)

| SCORE | PERCENTAGE |
| --- | --- |
| /29 | % |

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Q1.

In 2014, nearly 155 000 people died from cardiovascular disease in the UK.

Drugs have been developed to treat people with cardiovascular disease.

Developing drugs involves many stages.
One stage involves testing the drugs on other mammals before testing them on humans.

Give **one** disadvantage of using other mammals for drug testing.

**(1)**

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**(Total for question = 1 mark)**

Q2.

*Streptococcus* bacteria can cause a sore throat or skin infection.

An illness called scarlet fever can also develop during an infection with this bacterium.

(i) Give **two** precautions a doctor should take when treating a patient who is infected with *Streptococcus*.

**(2)**

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(ii) From September 2013 to March 2014 there were 2 830 cases of scarlet fever in the UK.

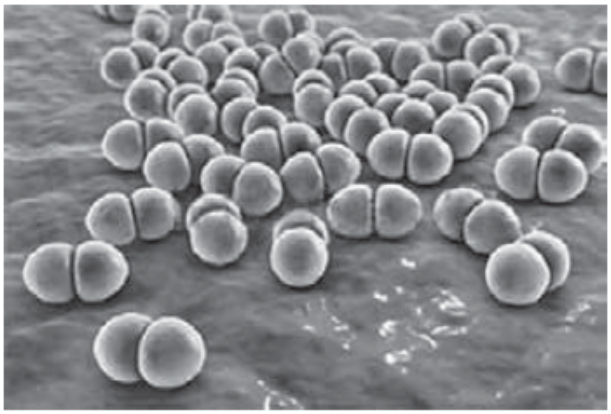
From September 2014 to March 2015 there were 5 943 cases of scarlet fever.

Calculate the percentage increase of the number of cases of scarlet fever between the periods September 2014 to March 2015 and September 2013 to March 2014.

**(2)**

..... %

(iii) Figure 10 shows some *Streptococcus* bacteria.



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**Figure 10**

Some bacteria are motile, meaning they can move themselves.

Why is a *Streptococcus* bacterium not motile?

**(1)**

- ☒ **A** it does not have flagella
- ☒ **B** it does not have plasmids
- ☒ **C** it does not have ribosomes
- ☒ **D** it does not have acrosomes

**(Total for question = 5 marks)**

Q3.

Patients with scarlet fever can be treated with antibiotics.

New antibiotics need to be tested before they can be used in patients.

Which is the correct sequence for the development of a new medicine?

**(1)**

☒ **A** testing in healthy volunteers → testing using cultured cells → double blind trials on patients

☒ **B** testing using cultured cells → double blind trials on patients → testing in healthy volunteers

☒ **C** testing in healthy volunteers → double blind trials on patients → testing using cultured cells

☒ **D** testing using cultured cells → testing in healthy volunteers → double blind trials on patients

**(Total for question = 1 mark)**

Q4.

**Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.**

Which data can be used to calculate the man's BMI?

**(1)**

☒ **A** waist circumference and height

☒ **B** waist circumference and hip circumference

☒ **C** mass and height

☒ **D** mass and hip circumference

**(Total for question = 1 mark)**

Q5.

**Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.**

The human immunodeficiency virus (HIV) can cause AIDS.

Which type of cell is destroyed by the HIV virus?

**(1)**

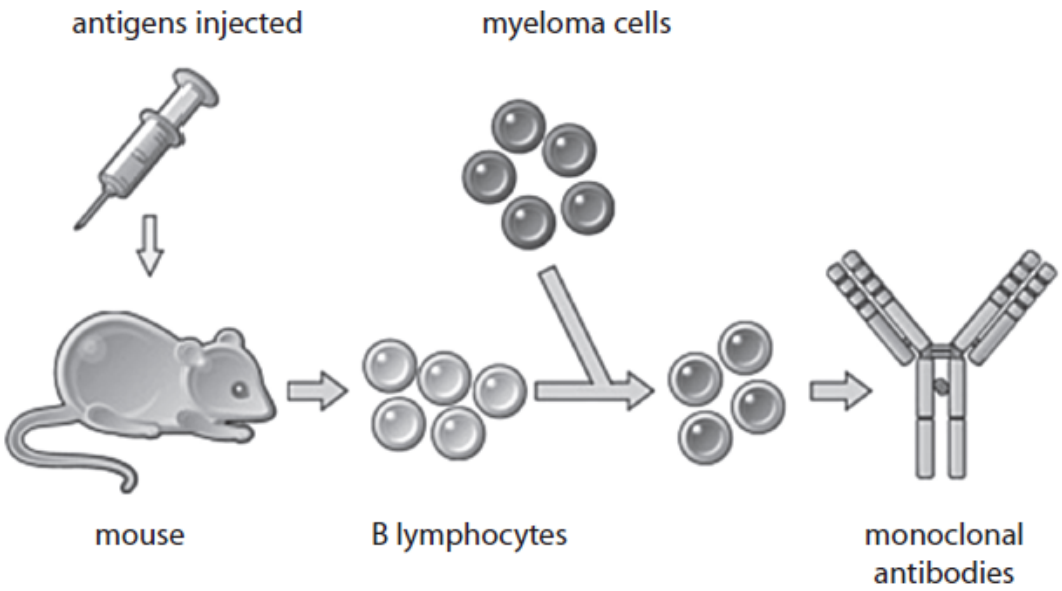
- ☒ **A** red blood cell
- ☒ **B** nerve cell
- ☒ **C** white blood cell
- ☒ **D** sperm cell

**(Total for question = 1 mark)**

Q6.

**Monoclonal antibodies and the immune response**

The diagram shows some stages in the production of monoclonal antibodies.




(a) (i) Complete the sentence using words from the box.

**(2)**

| | | |
|---|---|---|
| memory lymphocytes | exponential | hybridomas |
| immune | aseptic | myeloma cells |

Injecting antigens into the mouse produces an .....

response resulting in the production of antibodies and ..... .

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The cells produced when B lymphocytes and myeloma cells combine are

**(1)**

☒ **A** antibodies

☒ **B** hybridomas

☒ **C** memory lymphocytes

☒ **D** platelets

(iii) Describe **two** ways in which monoclonal antibodies are used in medical diagnosis.

**(2)**

1

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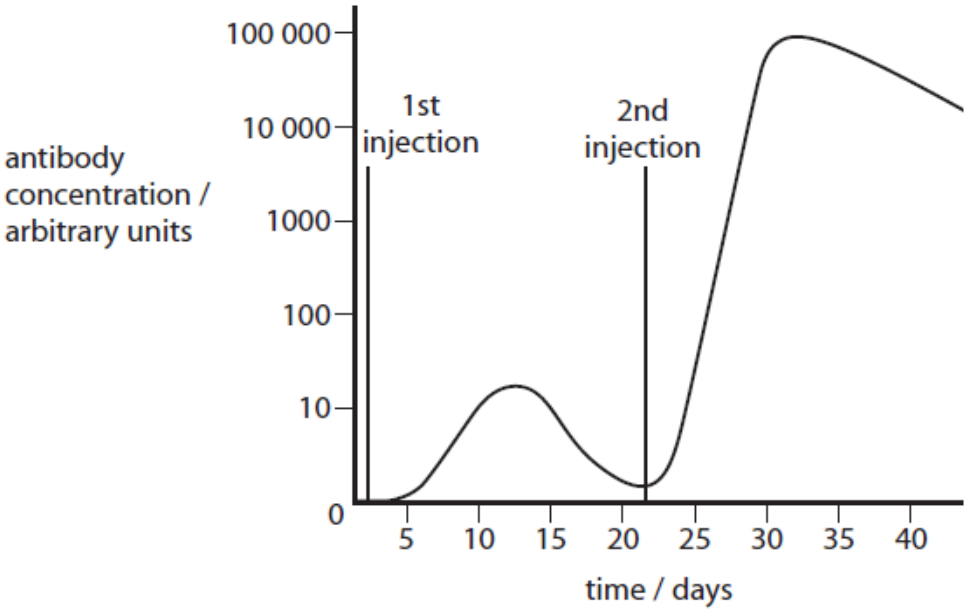
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(b) The graph shows the antibody concentration in a mouse after the first and second injection of the same antigens.




(i) Compare the antibody response after the first injection with the antibody response after the

second injection.

**(2)**

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(ii) Suggest how this secondary response to antigens benefits the mouse.

**(1)**

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(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Injecting patients with antigens forms the basis of vaccination.

This was first developed by

**(1)**

☒ **A** Diane Fossey

☒ **B** Edward Jenner

☒ **C** Louis Pasteur

☒ **D** Mary Leakey

**(Total for question = 9 marks)**

Q7.

Haemochromatosis is a disease that occurs when iron accumulates in the liver.

A person with haemochromatosis is treated by having 0.5 $dm^3$ of their blood removed each week.

This lowers the level of iron in their blood.

(i) Give **two** safety precautions needed when blood is removed from this person.

**(2)**

1 .....

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2 .....

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(ii) Haemochromatosis can be inherited.

Haemochromatosis occurs when a person inherits two copies of a recessive allele.

Figure 6 shows the inheritance of haemochromatosis in a family.

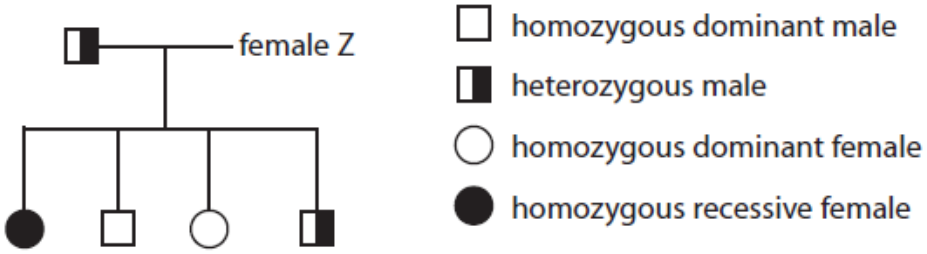



**Figure 6**

State and explain the genotype of female Z.

**(3)**

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**(Total for question = 5 marks)**

Q8.

Dieting can reduce the effects of cardiovascular disease.

(i) Which statement gives a reason why dieting can be used to reduce weight in obese people?

**(1)**

☒ **A** Dieting increases metabolism and growth rate

☒ **B** Dieting reduces energy consumption

☒ **C** Dieting decreases metabolism

☒ **D** Dieting increases energy consumption

(ii) A scientist is planning to test a new diet for weight loss.

She selects 40 obese people to take part in the test.

All the obese people are between 20 and 30 years of age.

State **two** other factors the scientist should control when selecting the people.

**(2)**

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(iii) Devise a plan the scientist could use to test the effectiveness of the new diet using the 40 obese people.

**(3)**

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**(Total for question = 6 marks)**

Q9.

(i) Explain why smoking tobacco increases the risk of developing lung cancer.

**(2)**

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(ii) Complete the sentence by putting a cross ( ☒ ) in the box next to your answer.

Smoking tobacco reduces the oxygen carrying ability of the blood because it contains

**(1)**

☒ **A** carbon monoxide

☒ **B** carbon particles

☒ **C** nicotine

☒ **D** tar

Q10.

A chemical in tobacco acts as a stimulant.

Explain how stimulants affect neurotransmission.

**(3)**

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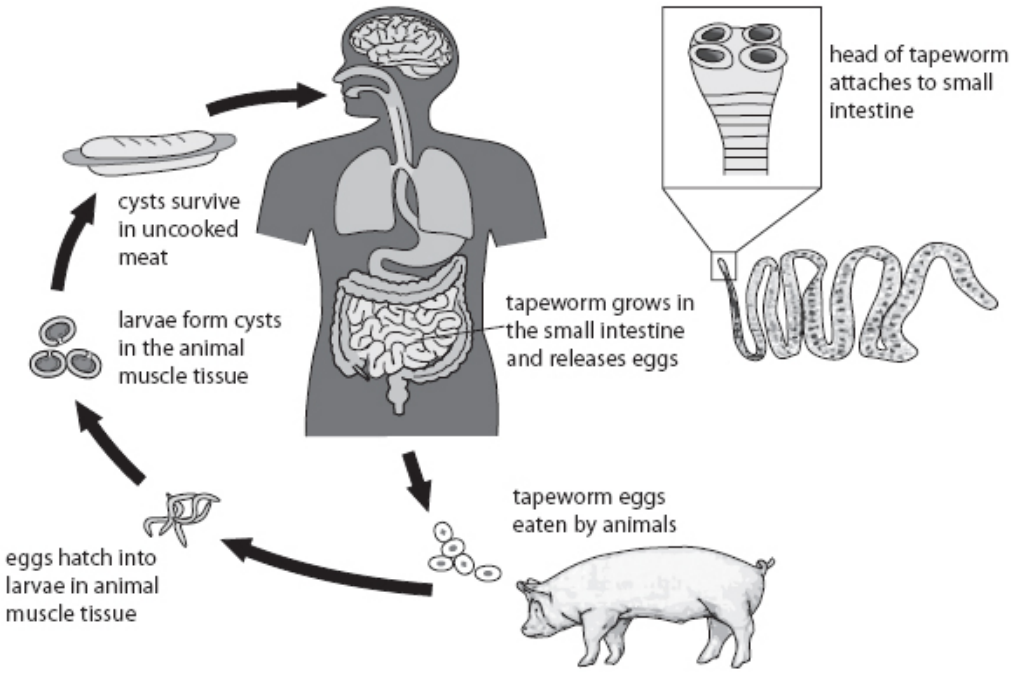
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Q11.

The diagram shows the life cycle of the human tapeworm.




(i) The tapeworm absorbs food in the human intestine.

Complete the sentence by putting a cross ( ☒ ) in the box next to your answer.

A tapeworm is an example of a

**(1)**

☒ **A** living indicator

☒ **B** mutualist

☒ **C** parasite

☒ **D** producer

(ii) Use information in the diagram to describe how an adaptation of the tapeworm enables it to live in the human intestine.

**(2)**

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(iii) Using information in the diagram, suggest how humans could avoid becoming infected with tapeworms.

**(2)**

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Q12.

Complete the sentence by putting a cross ( ☒ ) in the box next to your answer.

The molecules on pathogens which cause an immune response are called

**(1)**

☒ **A** antigens

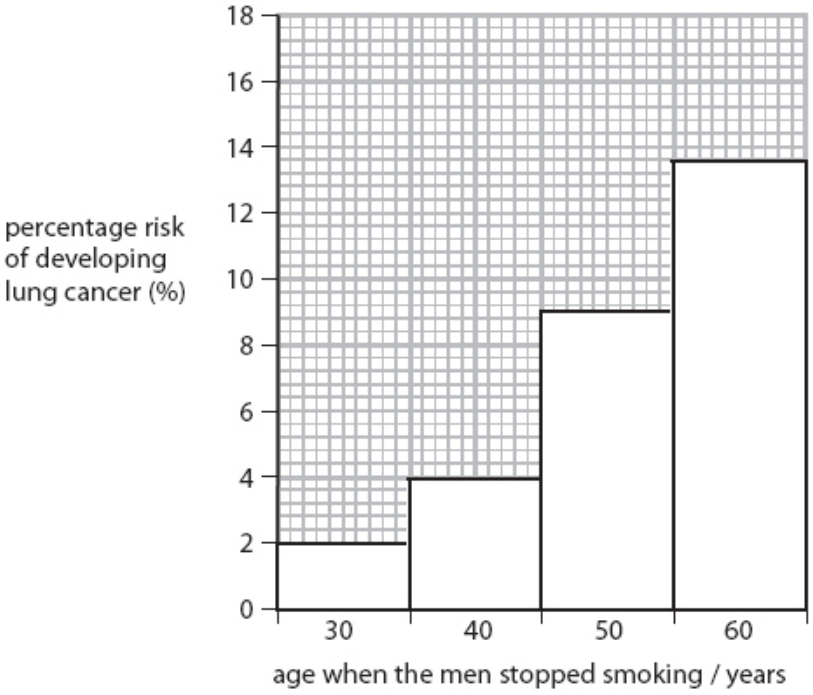
☒ **B** bacteria

☒ **C** hybridomas

☒ **D** lymphocytes

Q13.

The graph shows the percentage risk of developing lung cancer for 75-year-old men who gave up smoking tobacco at an earlier age.




(i) Describe the trend shown in the graph.

**(1)**

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(ii) State the percentage risk of lung cancer for a man who gave up smoking at 50 years of age.

**(1)**

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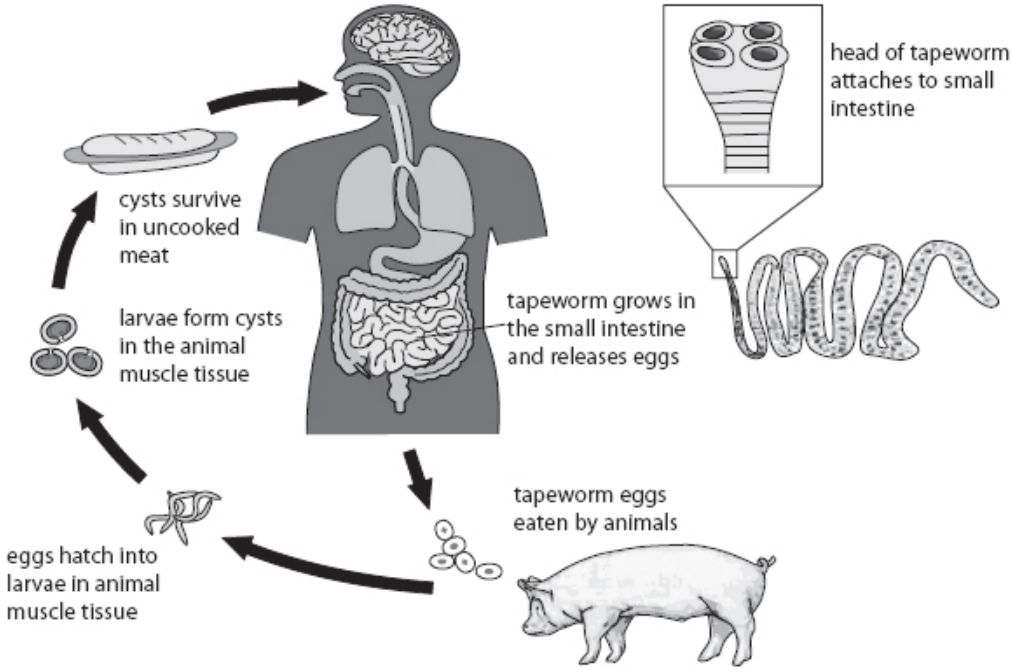
(iii) For a population of 500 000 men, how many would be likely to develop lung cancer if they stopped smoking at the age of 50?

**(2)**

.....men

Q14.

(a) The diagram shows the life cycle of the human tapeworm.




(i) The tapeworm absorbs food in the human intestine.

Complete the sentence by putting a cross ( ☒ ) in the box next to your answer.

A tapeworm is an example of a

**(1)**

- ☒ **A** living indicator
- ☒ **B** mutualist
- ☒ **C** parasite
- ☒ **D** producer

(ii) Use information in the diagram to describe how an adaptation of the tapeworm enables it to live in the human intestine.

**(2)**

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(iii) Using information in the diagram, suggest how humans could avoid becoming infected with tapeworms.

**(2)**

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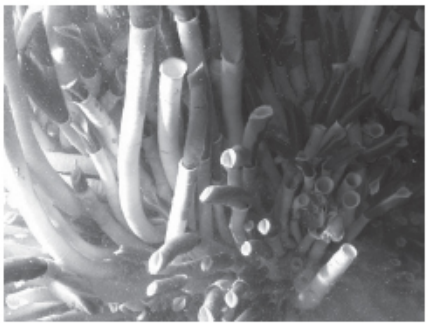
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(b) The photograph shows another type of worm.

These are tube worms that live near hydrothermal vents.



Explain the relationship between these tube worms and chemosynthetic bacteria.

**(3)**

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**(Total for Question = 8 marks)**