PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

BIOLOGY



EXAM QUESTION PACK

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

SCORE	PERCENTAGE
/110	%

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Q1.

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 ☒.

In 2017, a new strain of *Klebsiella pneumoniae* bacteria was discovered that was resistant to 26 different antibiotics.

(i) Explain how *Klebsiella pneumoniae* bacteria developed resistance to antibiotics.

(4)

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(ii) State how the use of antibiotics could contribute to *Klebsiella pneumoniae* bacteria developing resistance to antibiotics.

(1)

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(iii) *Klebsiella pneumoniae* is a prokaryotic cell.

Which is a characteristic feature of a prokaryotic cell?

(1)

☒ **A** it has chloroplasts

☒ **B** it does not have a nucleus

☒ **C** it does not have ribosomes

☒ **D** it cannot reproduce without a host

(Total for question = 6 marks)

Q2.

There is a shortage of kidneys for organ transplants.

Figure 6 shows the number of organ transplants needed and the number of donors available in the USA from 1991 to 2018.

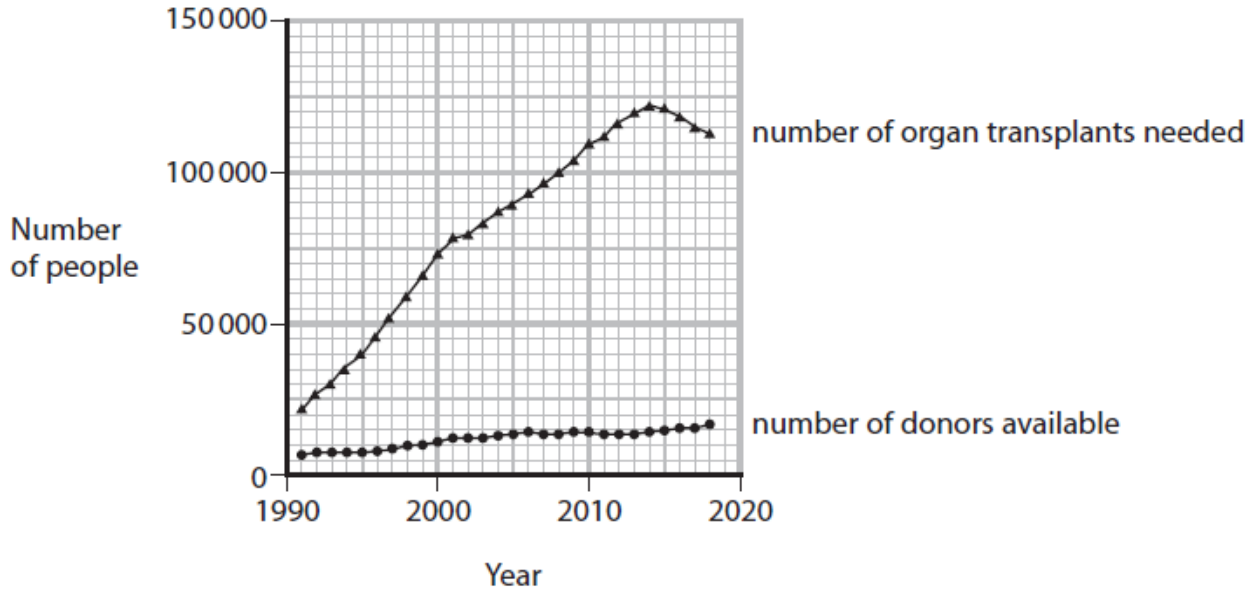


Figure 6

(i) Compare the number of donors available with the number of organ transplants needed from 1991 to 2018.

Use information from the graph to support your answer.

(3)

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(ii) State why scientists are genetically engineering animals for organ transplants.

(1)

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(Total for question = 4 marks)

Q3.

Figure 2 shows the number of people diagnosed with sexually transmitted infections (STIs) in the UK during 2017.

sexually transmitted infection (STI)	number of people diagnosed per 1000 of the population
chlamydia	3.7
gonorrhoea	0.8
genital herpes	0.6
genital warts	1.1
syphilis	0.1

Figure 2

(i) State the sexually transmitted infection that has the median number of people diagnosed.

(1)

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(ii) The population of the UK in 2017 was 66 million people.

Calculate the total number of people diagnosed with chlamydia in the UK in 2017.

(2)

..... people

(iii) State why chlamydia can be described as a communicable disease.

(1)

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(iv) Give **one** way the transmission of chlamydia can be prevented.

(1)

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(v) Explain why chlamydia can be treated with antibiotics.

(2)

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(Total for question = 7 marks)

Q4.

The ratio of waist-to-hip measurements can be used to determine the risk of a person developing cardiovascular disease.

Calculate the waist-to-hip ratio for a person with a waist measurement of 830 mm and a hip measurement of 0.99 m.

Give your answer to 2 decimal places.

(2)

Answer = ...

(Total for question = 2 marks)

Q5.

BMI and waist : hip ratio can be used to find out if a person is obese.

Figure 3 shows some data for two males.

male	BMI	waist : hip ratio
A	27.3	0.85
B	?	0.81

Figure 3

BMI is calculated using the equation:

$$\text{BMI} = \frac{\text{mass in kilograms}}{(\text{height in metres})^2}$$

(i) Male B has a mass of 72 kg and a height of 1.81 m.

Calculate the BMI of male B.

Give the answer to 3 significant figures.

(3)

BMI = ...

(ii) Figure 4 shows the interpretation of BMI values.

BMI range	interpretation
below 18.5	underweight
18.5 – 24.9	normal
25.0 – 29.9	overweight
30.0 and above	obese

Figure 4

Males with a waist : hip ratio above 0.90 are defined as abdominally obese.

Explain what the BMI and waist : hip ratio for male A shows about his weight distribution.

(2)

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(Total for question = 5 marks)

Q6.

Figure 1 shows the number of people per million **of the population** in five European countries who were diagnosed with measles in one year.

country	number of people diagnosed with measles per million of the population
Belgium	21.00
France	15.63
Germany	8.42
Italy	20.06
Norway	0.05

Figure 1

(i) The population of Belgium in that year was 11.18 million.

Calculate the number of people in Belgium diagnosed with measles.

Give your answer to three significant figures.

(3)

..... people

(ii) Countries do not report the total number of people diagnosed with measles.
Countries report the number of people diagnosed with measles per million of the population.

Give **one** reason why this is better.

(1)

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(iii) Give **one** reason why the number of people per million diagnosed with measles is different in these countries.

(1)

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(Total for question = 5 marks)

Q7.

Figure 5 shows how alcohol consumption increases the risk of developing liver cancer.

Someone who does not drink alcohol has a 1.0 risk of developing liver cancer.

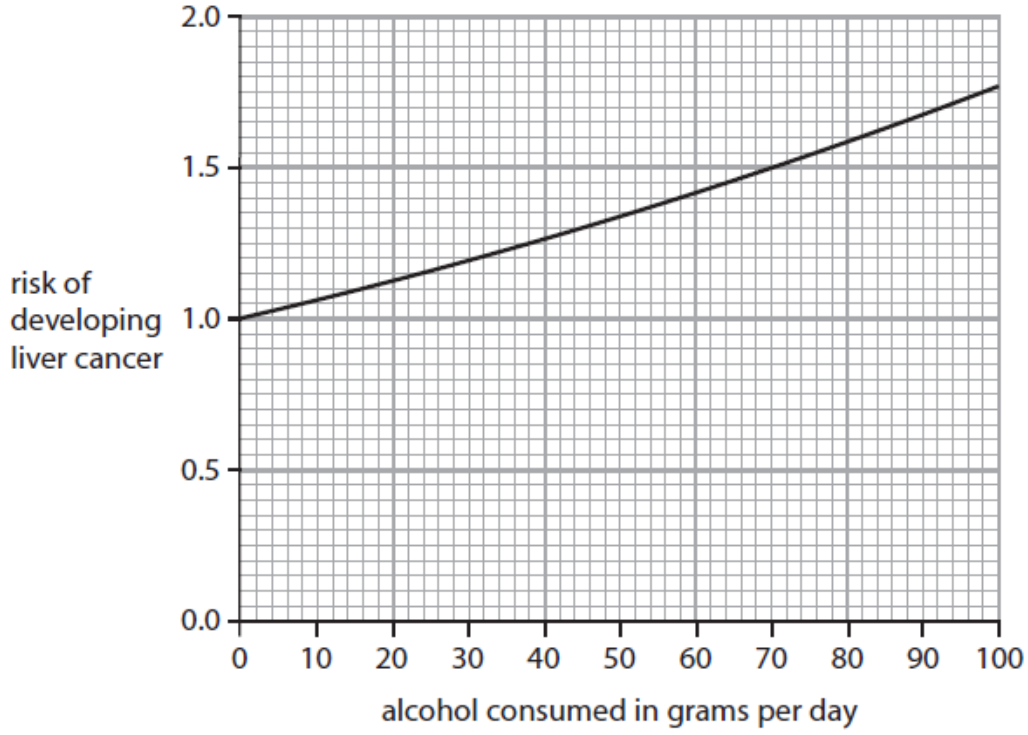


Figure 5

(i) One unit of alcohol contains 8 grams of alcohol.

Calculate the risk of developing liver cancer for someone who consumes 4 units of alcohol a day.

(2)

..... risk of developing liver cancer

(ii) Describe how cancer develops in the liver.

(2)

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(Total for question = 4 marks)

Q8.

Tuberculosis (TB) is a communicable disease.

(i) State **two** ways that communicable diseases are different from non-communicable diseases.

(2)

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2 .....

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(ii) Explain **one** way that the spread of tuberculosis (TB) can be reduced or prevented.

(2)

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(iii) A student researched the number of people with TB in some countries.

Figure 3 shows the student's data.

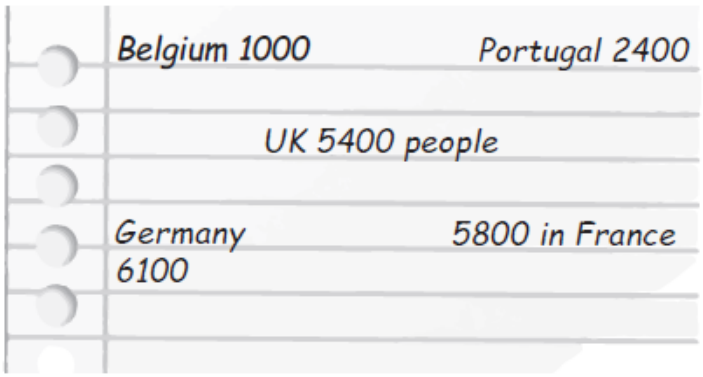


Figure 3

Complete the table to show the student's data.

(2)

(Total for question = 6 marks)

Q9.

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 ☒.

Cancer Research UK found that many people do not realise that obesity is linked to an increased risk of developing cancer.

In the body, fat tissue sends signals that cause other cells to divide.

(i) Describe how this could cause cancer to develop.

(3)

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(ii) Cell division occurs during the cell cycle.

During which stage of the cell cycle is DNA replicated?

(1)

☒ **A** anaphase

☒ **B** prophase

☒ **C** interphase

☒ **D** telophase

(iii) Obesity is linked to 1 in 20 cases of all types of cancer.

Approximately 13% of cases of bowel cancer are caused by obesity.

Determine how the impact of obesity on bowel cancer compares to the impact of obesity on all types of cancer.

(2)

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(Total for question = 6 marks)

Q10.

Describe how the specific immune system defends the body against disease.

(3)

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(Total for question = 3 marks)

Q11.

Obesity can also cause cardiovascular disease to develop.

Describe the different treatments available for cardiovascular disease.

(3)

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(Total for question = 3 marks)

Q12.

LDL cholesterol is a type of cholesterol which increases the risk of heart disease.

Statins are drugs used to reduce LDL cholesterol levels.

Figure 6 shows the cholesterol levels in the blood of a man.

He started taking statins at the beginning of February and stopped taking them four months later.

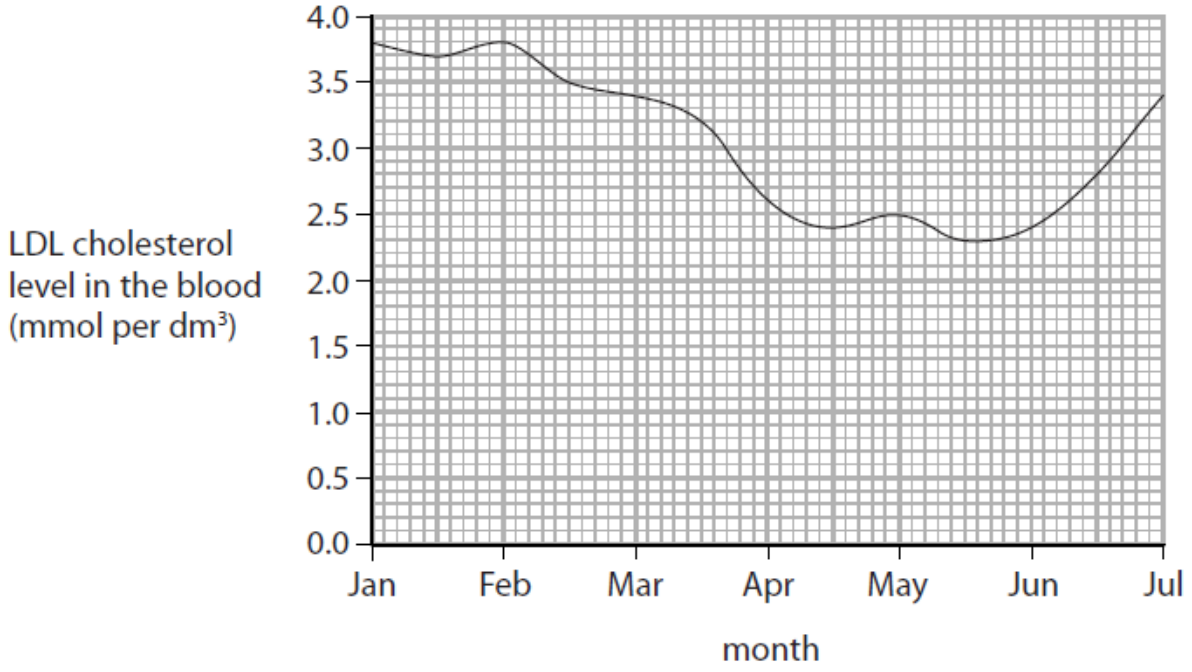


Figure 6

(i) Describe the effect of statins on LDL cholesterol levels in the blood.

Use data from the graph to support your answer.

(2)

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(ii) Use evidence from the graph to explain why statins are usually prescribed as life-long medication.

(2)

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(Total for question = 4 marks)

Q13.

New antibiotics are being developed to treat the disease caused by *Klebsiella pneumoniae*.

Describe the stages of antibiotic development that would occur after the discovery of a new antibiotic.

(3)

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(Total for question = 3 marks)

Q14.

Disease

(a) The photograph shows a housefly.



(i) Houseflies can be the animal vector for the disease dysentery.

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

The disease dysentery is caused by a

(1)

☒ **A** bacterium

☒ **B** fungus

☒ **C** protozoan

☒ **D** virus

(ii) Describe how a housefly can cause a person to become infected with dysentery.

(2)

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(iii) Explain how a chemical defence mechanism of the human body can reduce the chance of dysentery.

(3)

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(b) Explain how the *Anopheles* mosquito can spread the disease malaria.

(2)

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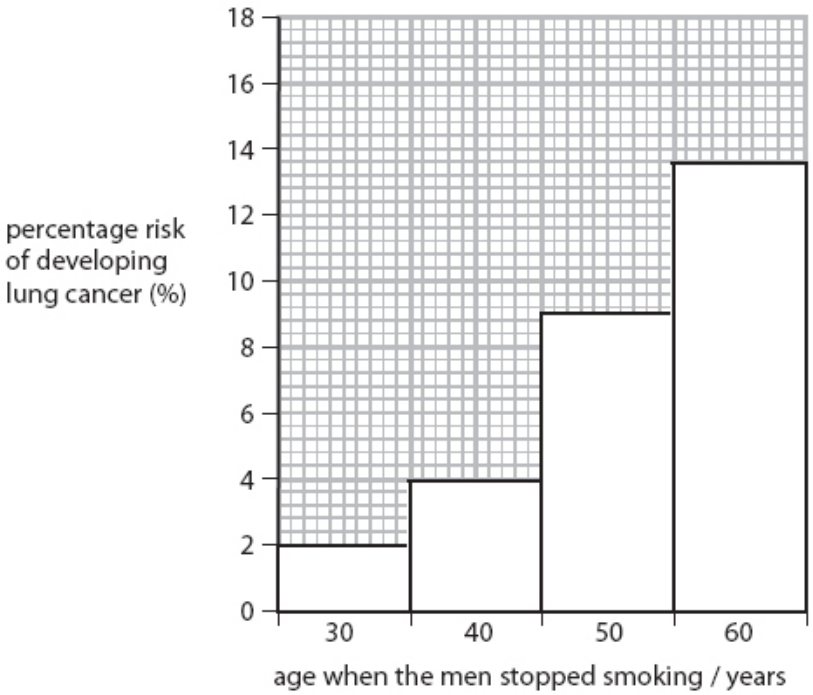
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(Total for question = 8 marks)

Q15.

(a) 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)

.....%

(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

(b) (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

(c) A chemical in tobacco acts as a stimulant.

Explain how stimulants affect neurotransmission.

(3)

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(Total for Question = 10 marks)

Q16.

Figure 2 shows a gastric band fitted to a stomach.

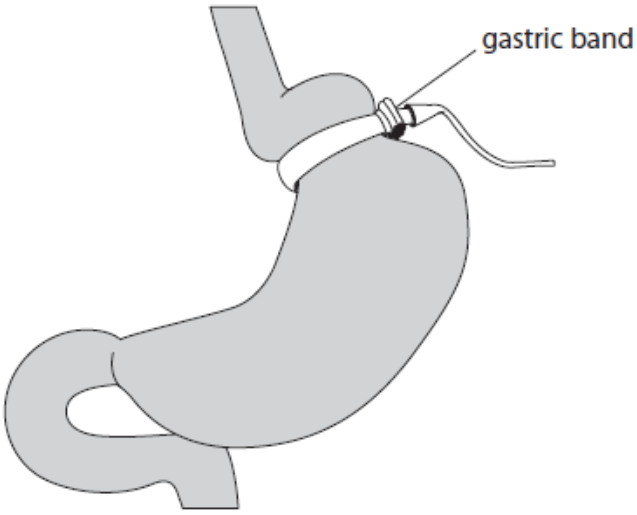


Figure 2

Explain how a gastric band helps a person to lose weight.

(2)

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(Total for question = 2 marks)

Q17.

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

Figure 2 shows the use of a stent to treat cardiovascular disease.

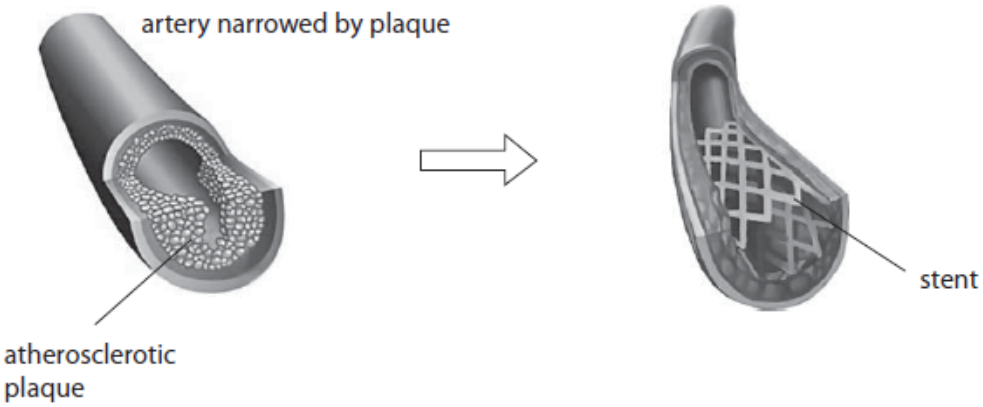


Figure 2

Explain how a stent works to treat cardiovascular disease.

(3)

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(Total for question = 3 marks)

Q18.

Most cases of scarlet fever occur in children.

Adults have usually developed immunity to a toxin that the *Streptococcus* bacteria produce during infection.

Explain how an adult develops immunity to the toxin.

(3)

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(Total for question = 3 marks)

Q19.

* Bacteria have been genetically engineered to produce human insulin since 1978.

Explain how bacteria can be genetically engineered to produce human insulin.

(6)

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(Total for question = 6 marks)

Q20.

Gonorrhoea is a sexually transmitted bacterial infection.

Figure 7 shows the number of people diagnosed with gonorrhoea in the UK.

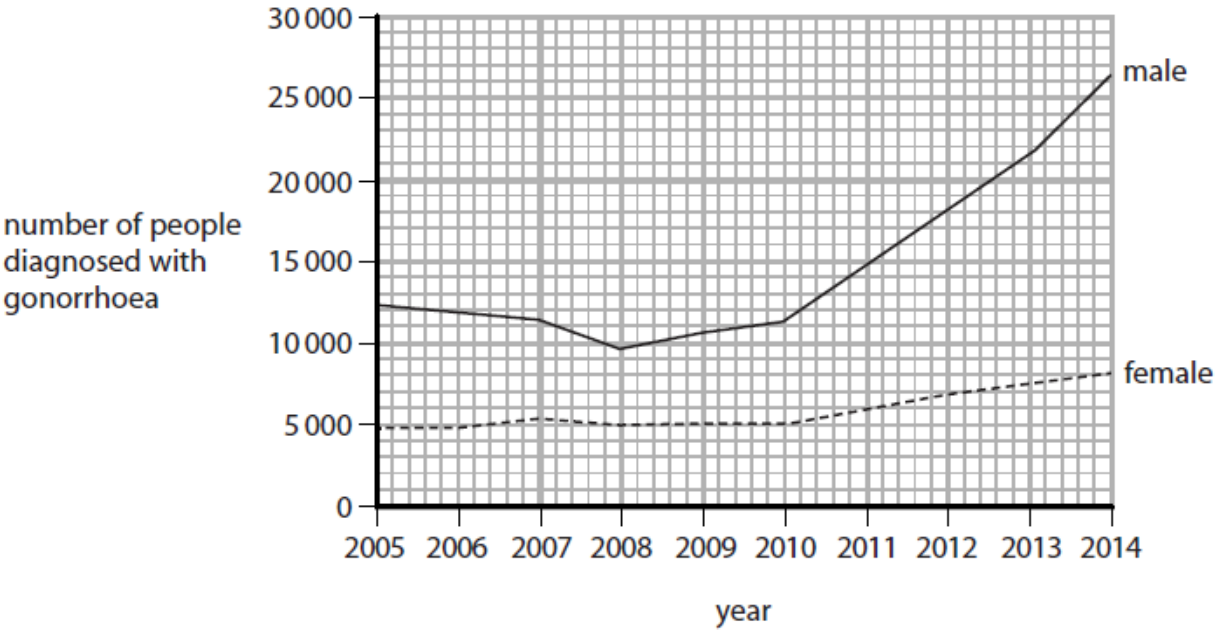


Figure 7

Explain how gonorrhoea is transmitted and how the number of people infected can be reduced.

Use data from the graph to justify why it is necessary to reduce the number of people infected.

(Total for question = 6 marks)

Q21.

HIV is another sexually transmitted infection.

Explain how HIV can lead to the onset of AIDS.

(2)

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(Total for question = 2 marks)

Q22.

Colistin is an antibiotic used to treat infections in the bloodstream.

Some bacteria are resistant to Colistin.

Explain how these bacteria have become resistant to Colistin.

(4)

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(Total for question = 4 marks)

Q23.

When bacteria divide they replicate their genome and synthesise their cell wall.

Figure 12 outlines the stages of bacterial replication.

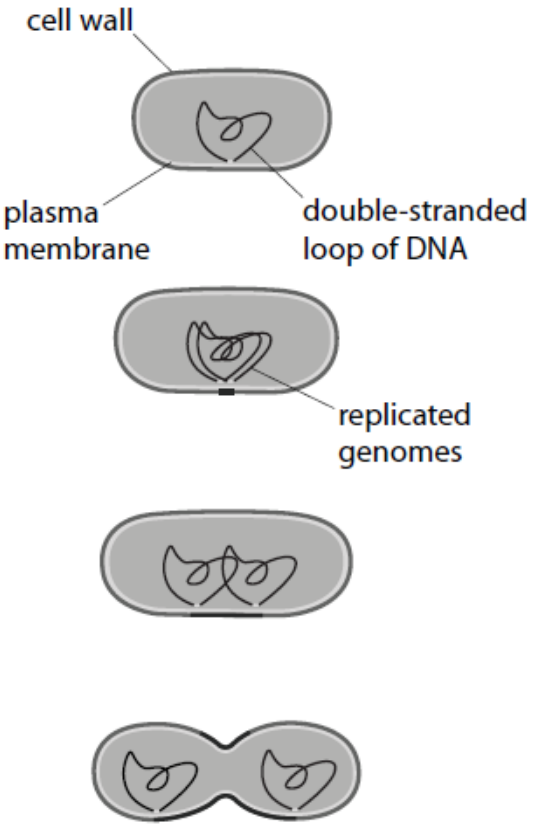


Figure 12

Penicillin inhibits the synthesis of the cell wall in bacteria.

Explain the effect of penicillin on bacterial and human cells.

(3)

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(Total for question = 3 marks)

Q24.

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

Give the reason why cardiovascular disease is a non-communicable disease.

(1)

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(Total for question = 1 mark)

Q25.

Obesity increases the risk of a person developing cardiovascular disease.

Losing weight can reduce the risk of this disease occurring.

Explain why exercise can cause weight loss.

(2)

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(Total for question = 2 marks)

Q26.

Explain why people with AIDS are more susceptible to TB.

(2)

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(Total for question = 2 marks)

Q27.

Clostridium tetani is a bacterium that can be found in soil.

It causes the infection tetanus.

Children are vaccinated against tetanus.

Explain why these children do not get tetanus if the bacteria enter their body through a cut in the skin.

(3)

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(Total for question = 3 marks)

Q28.

Two men have the same mass of 80 kg.

One man's BMI is categorised as normal weight, the other man's BMI is categorised as obese.

Explain why the men have different BMI values.

(2)

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(Total for question = 2 marks)

Q29.

Name the organisation which defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

(1)

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(Total for question = 1 mark)

Q30.

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

Figure 1 shows information about the BMI and the lifestyle of two males, P and Q, who have the same height and age.

male	BMI	physical exercise in hours per week	percentage of total daily intake of nutrients (%)		
			carbohydrate	protein	fat
P	24	7	50	20	30
Q	29	2	50	15	35

Figure 1

(i) Which measurements are used to calculate BMI?

(1)

☒ **A** waist and hip

☒ **B** hip and mass

☒ **C** height and mass

☒ **D** waist and height

(ii) Explain which male has a greater risk of developing cardiovascular disease.

(3)

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(Total for question = 4 marks)