PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

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

SCORE	PERCENTAGE
/66	%

STEMUP

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Q1.

Figure 10 shows part of a method used to produce a bacterial culture on a Petri dish.

Step 1. Sterilise Petri dish and agar before use

Step 2. Pass inoculating loop through a flame

Step 3. Allow inoculating loop to cool

Step 4. Use inoculating loop to collect bacterial sample

Step 5. Use inoculating loop to spread bacteria onto agar

Figure 10

(i) State why step 1 and step 2 are necessary.

(1)

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(ii) Give **one** reason why step 3 is included.

(1)

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* (iii) A student wanted to investigate how effective three different antiseptics were at killing bacteria.

The student was provided with:

- an inoculated Petri dish prepared using the method in Figure 10
- three different antiseptics
- filter paper discs
- sticky tape.

Devise a plan for the student to complete this investigation.

Include a control and any variables that the student would need to consider.

(6)

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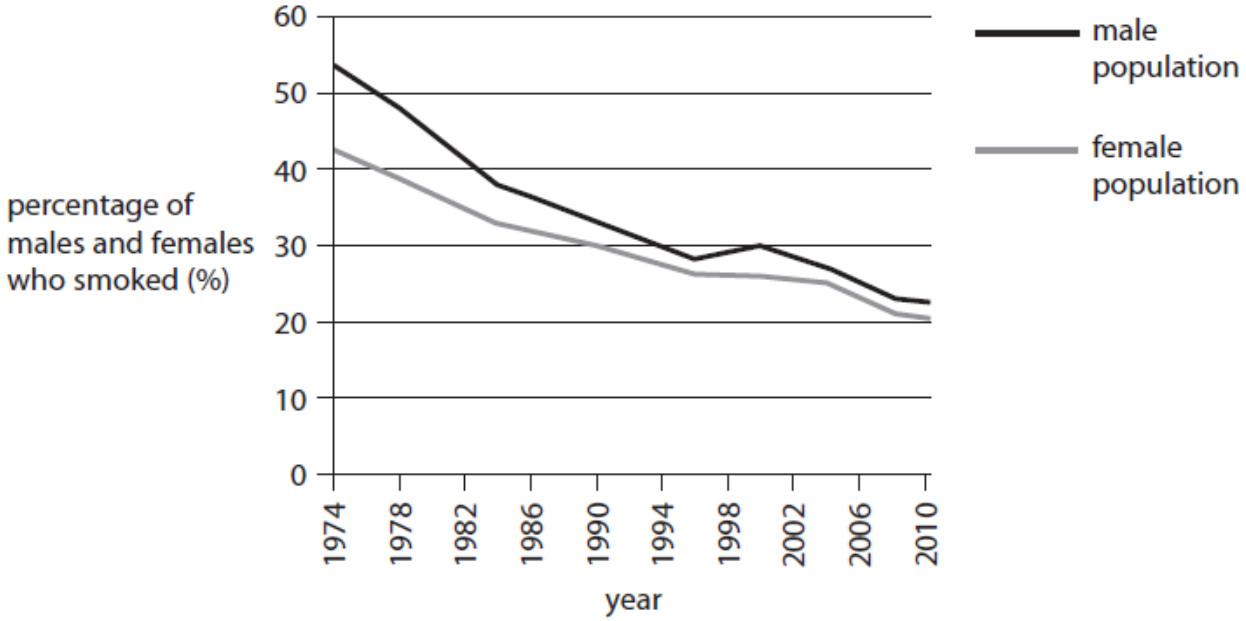
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(Total for question = 8 marks)

Q2.

The graph shows some data about smoking tobacco in the UK.



(i) Calculate the decrease in the percentage of females who smoked tobacco from 1990 to 2010.

(1)

..... %

(ii) Suggest **two** reasons why smoking tobacco has decreased in the UK.

(2)

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Q3.

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)

Q4.

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.

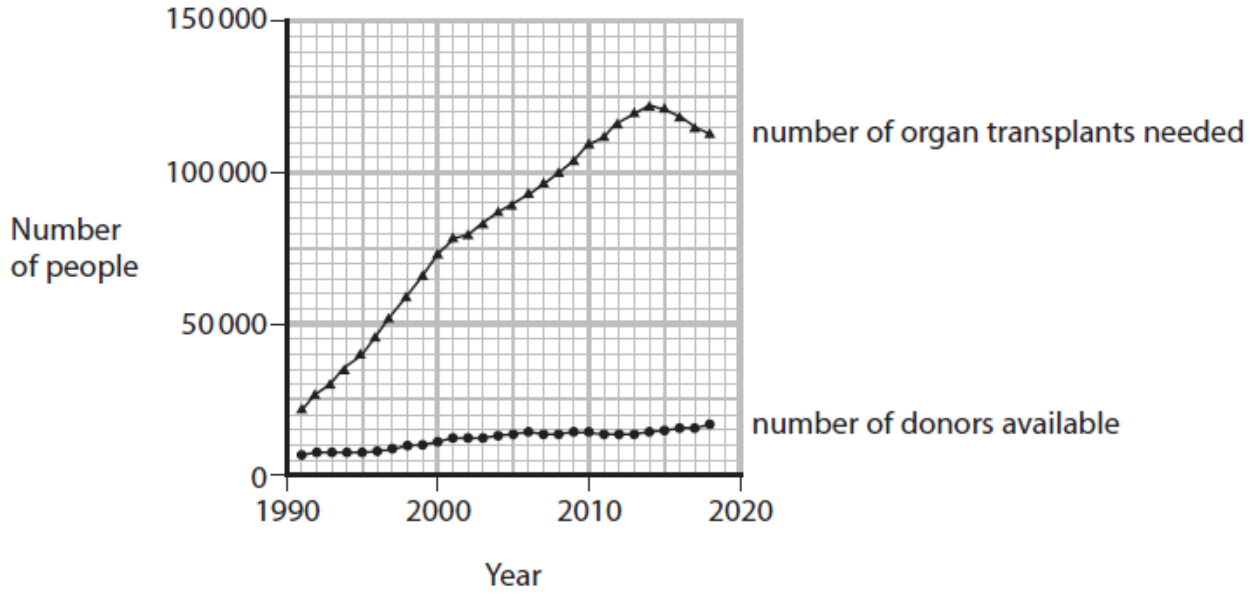


Figure 6

(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)

Q5.

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)

.....

(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)

Q6.

The scientist placed a filter paper disc soaked in toothpaste mixed with saliva (disc A) on one half of the agar jelly plate.

A filter paper disc soaked in only saliva (disc B) was placed on the other half of the agar jelly plate.

The agar jelly plate was kept at 37°C for 24 hours.

Figure 5 shows the results.

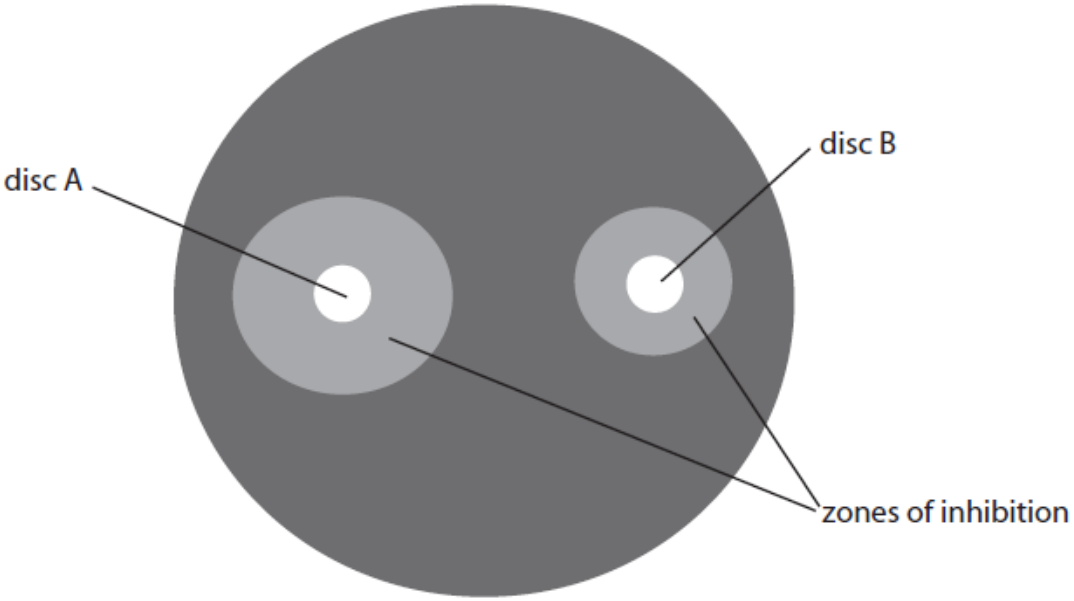


Figure 5

(i) The diameter of the zone of inhibition around disc A is 9 mm.

Calculate the area of this zone of inhibition using the equation πr^2.

Use a value of 3.14 for π.

Give your answer to 1 decimal place.

(3)

..... mm^2

(ii) Give a reason why disc B, soaked in only saliva, was included in this test.

(1)

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(iii) Suggest **two** reasons why this test does not prove that toothpaste kills all bacteria on teeth.

(2)

1 .....

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2 .....

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(Total for question = 6 marks)

Q7.

Tuberculosis (TB) is a communicable disease.

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

(2)

1 .....

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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 4 shows the student's data.

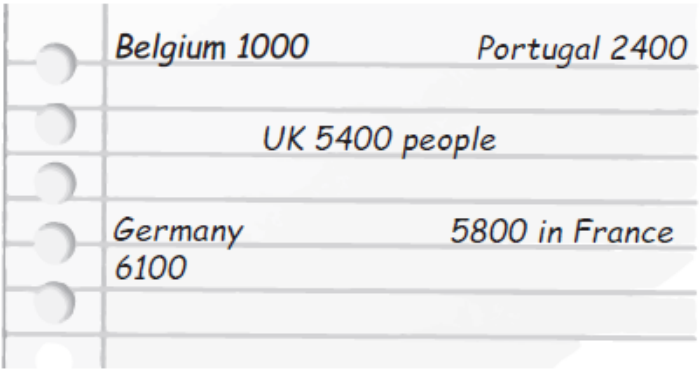


Figure 4

Complete the table to show the student's data.

(2)

(Total for question = 6 marks)

Q8.

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 ☒.

Monoclonal antibodies are proteins.

Figure 16 shows the process of monoclonal antibody production.

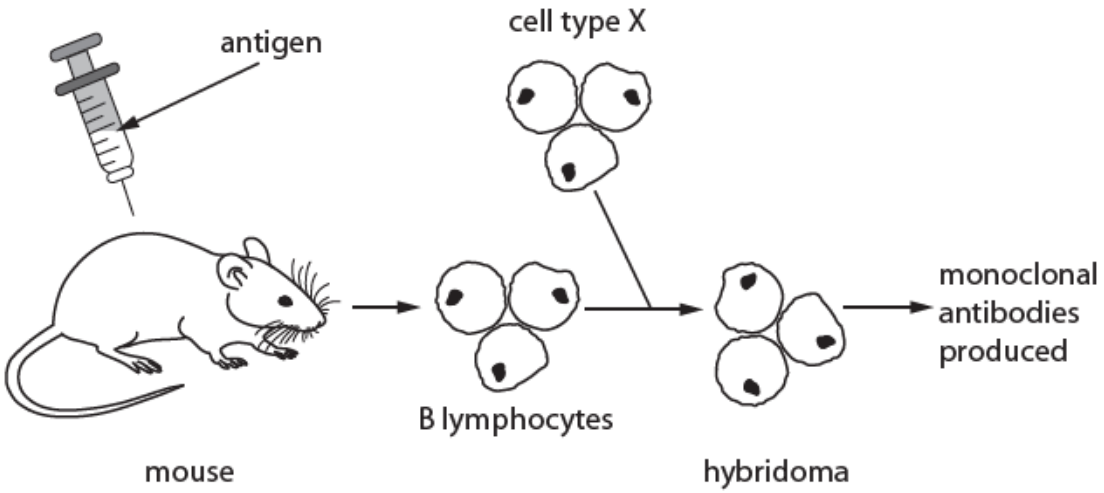


Figure 16

(i) Which type of cell is added to the B lymphocytes to produce the hybridoma?

(1)

☒ **A** phagocytic cell

☒ **B** red blood cell

☒ **C** cancer cell

☒ **D** epithelial cell

(ii) A person with blood group A has the A antigen on the surface of their red blood cells.

Monoclonal antibodies can be used to detect the A antigen on red blood cells to determine the blood group of a person.

Explain why monoclonal antibodies, used to detect blood group A, would not react with the blood of a person with blood group B.

(3)

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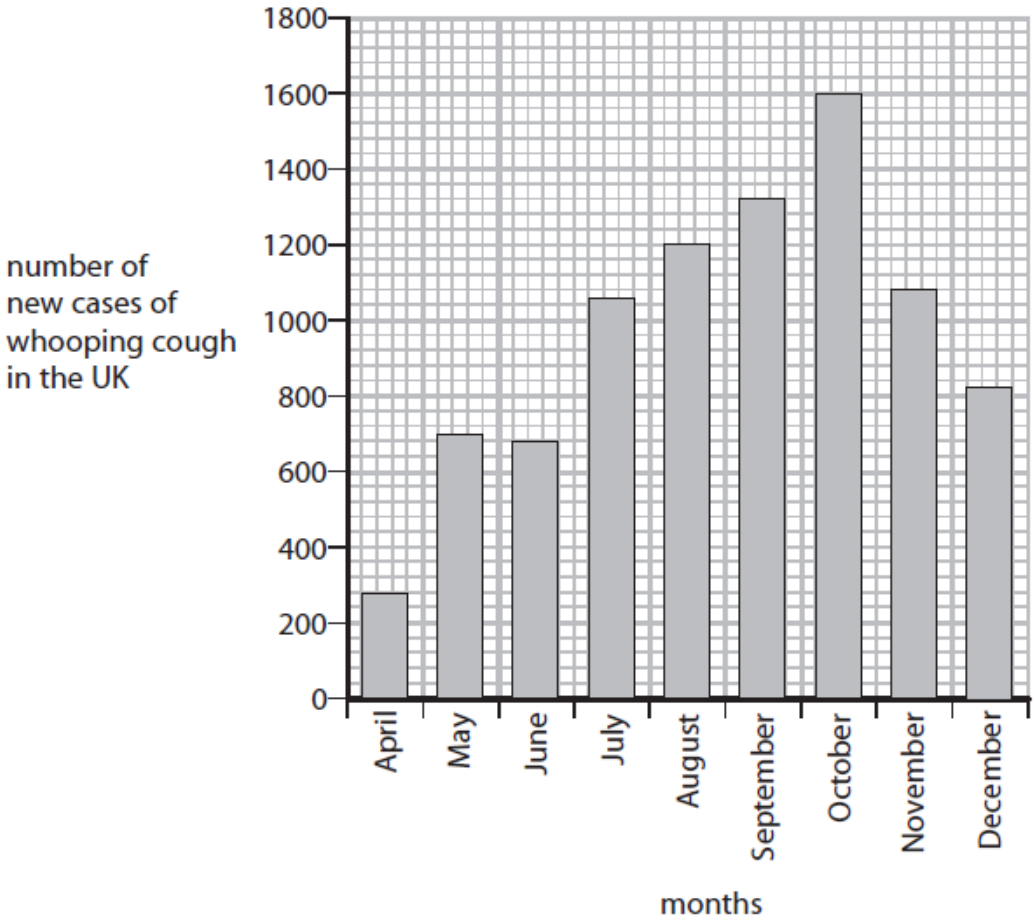
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(Total for question = 4 marks)

Q9.

In 2012 there was an outbreak of whooping cough in the UK.

The graph shows the number of new cases of whooping cough in the UK from April to December 2012.



(a) (i) Describe the trend shown in the graph from April to December.

(1)

.....

.....

(ii) In September 2011 there were 168 cases of whooping cough in the UK.

Calculate the difference in the number of cases of whooping cough in September 2011 and September 2012.

(2)

..... cases

(b) Whooping cough is caused by the bacterium *Bordetella pertussis*, which grows rapidly in the human body.

State the term used to describe the rapid growth of a bacterial population.

(1)

.....

(c) Children in the UK can be immunised against whooping cough.

Suggest why outbreaks of whooping cough still occur in the UK.

(2)

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Q10.

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)

Q11.

Figure 8 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.

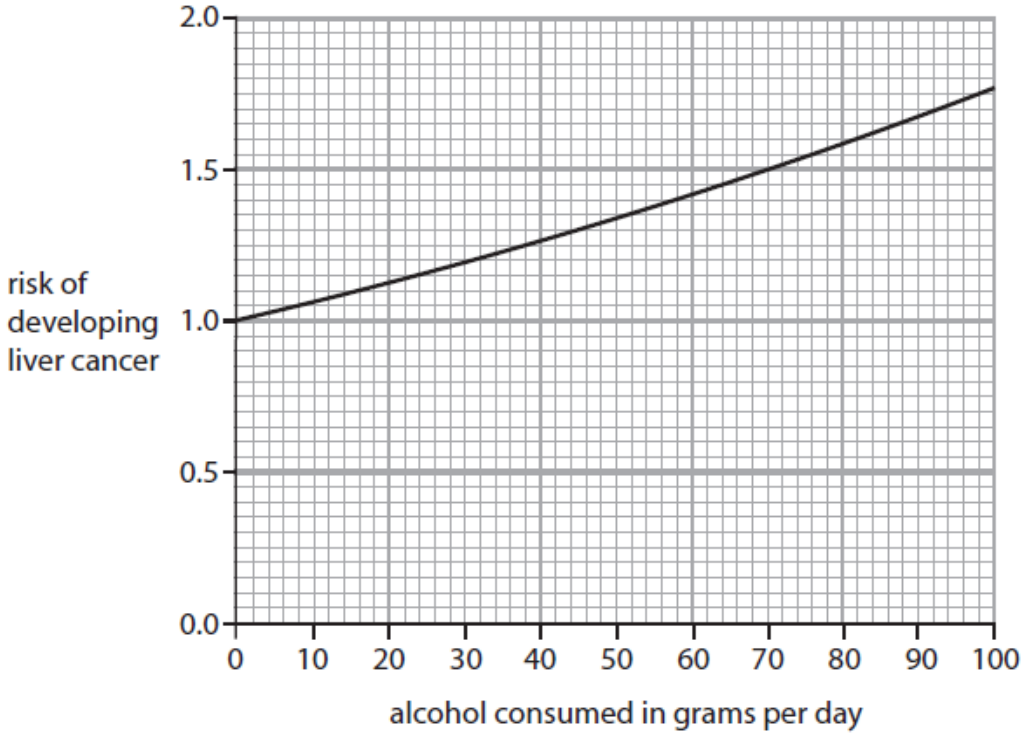


Figure 8

(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)

Q12.

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)

Q13.

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)

Q14.

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

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(3)

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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)

Q15.

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)