AQA GCSE Biology | 8461

SPECIFICATION POINT 4.2.2.7

Cancer

Past-paper questions

Tier	**Foundation**
Question groups	**16**
Available paper years	**2007–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.2.2.7 Cancer

Question 01

March 2007 | BLY1A | Original Q9 | Legacy

QUESTION NINE

Read the passage.

Sunshine For Breakfast

A journalist for a national newspaper reported that American army doctors had recognised that soldiers stationed in many sunny countries were less likely to suffer from some types of cancer.

They suggested that this was due to increased levels of vitamin D which is made in the skin when exposed to sunlight.

Vitamin D can be found in a range of foods such as cheese, eggs and milk.

Vitamin D helps with the absorption of calcium and phosphorus from food and reduces the chances of suffering from rickets.

The doctors compared data from large numbers of soldiers who had spent most of their careers in either sunny or less sunny climates.

Following the newspaper report, shoppers quickly bought all the vitamin D tablets from supermarkets and shops.

A spokesman for a leading health store said, 'It is unlikely that someone could overdose on vitamin D.'

9A What initial observation was made by the doctors?

1 Shoppers bought large amounts of vitamin D tablets when the newspaper report was released.

2 Soldiers in sunny countries are less likely to suffer from some types of cancer.

3 Vitamin D can be found in a range of foods such as cheese, eggs and milk.

4 Vitamin D is made in the skin.

9B What explanation did the doctors give for the initial observation?

1 Sunlight contains vitamin D.

2 There is insufficient data to come to a conclusion.

3 Vitamin D can be made in the skin when exposed to sunlight.

4 Vitamin D might help to reduce the number of some types of cancers.

4.2.2.7 Cancer

9C Which of these groups of people is most likely to provide valid evidence about the effect of vitamin D?

1 American army doctors

2 the journalist who wrote the newspaper article

3 one of the soldiers who were studied

4 the spokesman for the leading health store

9D A lack of vitamin D in the diet can lead to any of the following problems **except** . . .

1 a deficiency disease.

2 liver problems caused by absorbing too much calcium.

3 malnourishment.

4 rickets.

END OF TEST

4.2.2.7 Cancer

Question 02

November 2007 | BLY1A | Original Q6 | Legacy

QUESTION SIX

Read the passage:

> Scientists in America noticed that soldiers who had spent a long time in sunny countries were much less likely to suffer from cancer.
> They suggested that this was due to increased levels of vitamin D. The skin makes vitamin D when exposed to sunlight.
> To investigate this suggestion, the scientists collected data from large numbers of soldiers who had spent many years in sunny countries and compared this with data from large numbers of soldiers who had spent many years in less sunny countries.

Match words, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A a hypothesis

B a survey

C an independent variable

D an observation

	Information
1	high levels of vitamin D might reduce the chances of suffering from some cancers
2	soldiers who spend a lot of time in sunny countries are less likely to suffer from some cancers
3	the number of years spent in sunny countries
4	the collection of data from large numbers of soldiers

4.2.2.7 Cancer

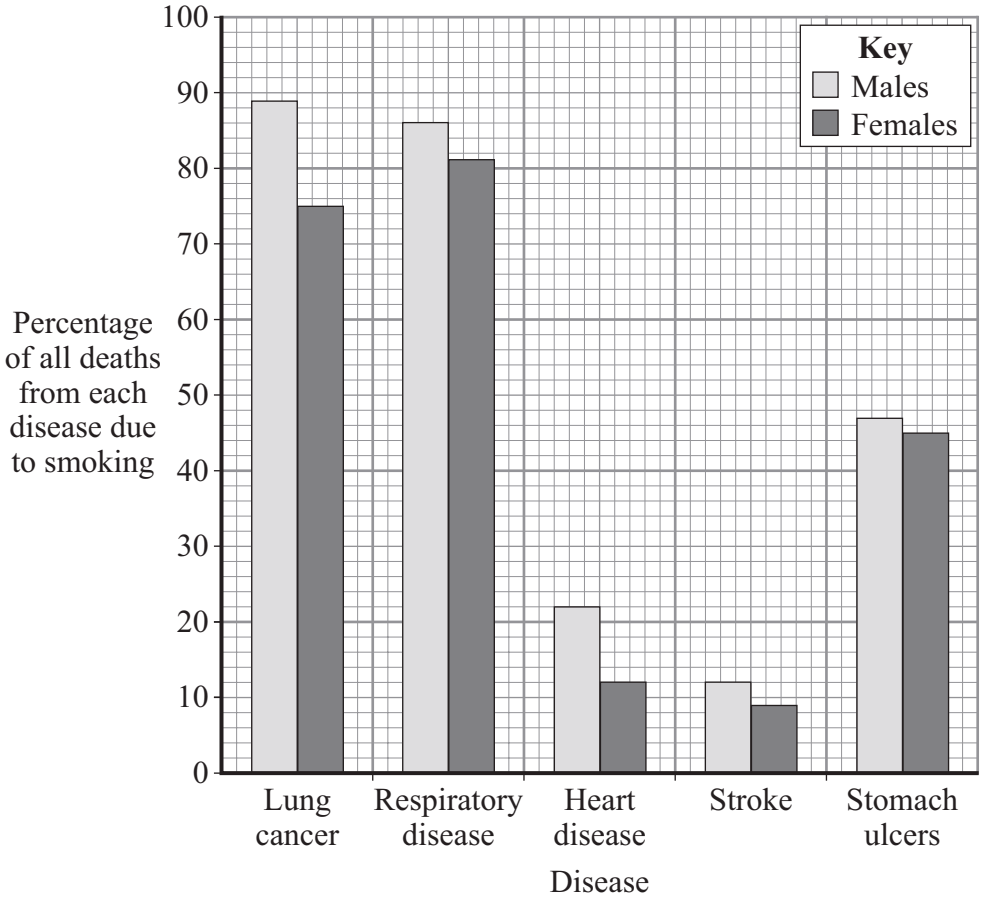
Question 03

June 2008 | BLY1AP | Original Q8 | Legacy

QUESTION EIGHT

This question is about smoking and disease.

The bar chart shows the percentages of deaths due to smoking for five different diseases.



8A In women, which disease shows the highest percentage of deaths that are thought to be due to smoking?

1 lung cancer

2 respiratory disease

3 heart disease

4 stroke

4.2.2.7 Cancer

Question 03 · continued

8B What percentage of deaths from respiratory disease in males is due to causes other than smoking?

1 12

2 14

3 81

4 86

8C The total number of women who died from stomach ulcers was 2220.

How many of these deaths were caused by smoking?

1 550

2 999

3 1110

4 1665

8D Which is the best conclusion that can be drawn from the bar chart?

1 Smoking causes most of the deaths due to stomach ulcers.

2 The chance of dying from any of the five diseases is increased if you smoke.

3 There is a strong link between smoking and death from heart disease.

4 The chance of dying from a stroke is not increased by smoking.

4.2.2.7 Cancer

Question 04

March 2009 | BLY1AP | Original Q3 | Legacy

QUESTION THREE

There are both legal drugs and illegal drugs.

Match substances, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A alcohol

B cocaine

C tobacco

D thalidomide

1	is linked to lung cancer
2	slows people's reactions
3	is used to treat leprosy
4	is an illegal drug that is very addictive

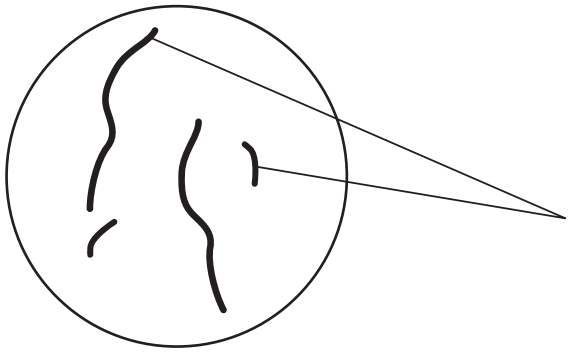
4.2.2.7 Cancer

Question 05

June 2009 | BLY2F | Original Q5 | Legacy

5 **Diagram 1** shows the nucleus of a body cell as it begins to divide by mitosis.

Diagram 1



.....

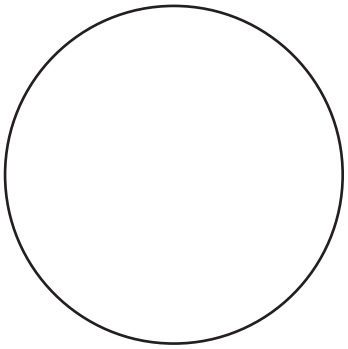
5 (a) Use a word from the box to label **Diagram 1**.

alleles	**chromosomes**	**gametes**

(1 mark)

5 (b) Complete **Diagram 2** to show what the nucleus of one of the cells produced by this mitosis would look like.

Diagram 2



(1 mark)

4.2.2.7 Cancer

Question 05 · continued

for mark

5 (c) Stem cells from a recently dead embryo can be grown in special solutions.

Some facts about stem cells are given below.

- Stem cells from an embryo can grow into any type of tissue.
- Stem cells may grow out of control, to form cancers.
- Large numbers of stem cells can be grown in the laboratory.
- Stem cells may be used in medical research or to treat some human diseases.
- Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.
- Collecting and growing stem cells is expensive.

Use **only** the information above to answer these questions.

5 (c) (i) Give **two** advantages of using stem cells.

1 .....

.....

2 .....

.....

(2 marks)

5 (c) (ii) Give **two** disadvantages of using stem cells.

1 .....

.....

2 .....

.....

(2 mark)

6

4.2.2.7 Cancer

Question 06

June 2009 | BLY3F | Original Q5 | Legacy

5 The table gives information about the growth of different types of organism.
The figures were obtained during the period of fastest growth for each organism.

Organism	Time taken to double in mass
Bacteria	40 minutes
Yeasts	2 hours
Fusarium	4 hours
Algae	5 hours
Soybeans	1 week
Cattle	8 weeks

5 (a) (i) Which type of organism grows the fastest? .....

(1 mark)

5 (a) (ii) How many times faster than cattle do soybeans double in mass?

.....

(1 mark)

5 (a) (iii) *Fusarium* grows at its fastest rate in a fermenter.
Some scientists put **one tonne** of *Fusarium* into a fermenter.

Use data from the table to calculate how much *Fusarium* there would be in the fermenter after 8 hours.

Draw a ring around **one** answer.

2 tonnes **4 tonnes** **8 tonnes**

(1 mark)

Question 06 · continued

for mark

5 (b) *Fusarium* is used to make mycoprotein.

Read the information about substances found in mycoprotein.

- Protein – can be used for making cells, enzymes and antibodies.
- Fats – are rich in energy but large amounts in the diet can cause circulatory problems.
- Dietary fibre – helps to reduce the risk of colon cancer.

The table compares the composition of mycoprotein and beef.

Substance	Percentage of dry mass	
	Mycoprotein	Beef
Protein	47.2	68.3
Fat	13.5	30.1
Dietary fibre	19.2	0.0

Use the information above to answer the questions.

5 (b) (i) Give **two** reasons why it would be better to eat mycoprotein instead of beef.

1 .....

.....

2 .....

.....

(2 marks)

(Extra space) .....

5 (b) (ii) Give **one** reason why it would be better to eat beef instead of mycoprotein.

.....

.....

(1 mark)

(Extra space) .....

6

4.2.2.7 Cancer

Question 07

November 2009 | BLY1AP | Original Q5 | Legacy

QUESTION FIVE

Some substances can harm the body.

Match substances, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A alcohol

B carbon monoxide

C carcinogen

D thalidomide

	Effect on body
1	reduces the amount of oxygen carried in the blood
2	may cause liver damage
3	may cause cancer
4	may cause limb abnormalities in babies

4.2.2.7 Cancer

Question 08

June 2010 | BLY1F | Original Q1 | Legacy

1 A healthy body needs a healthy diet.



Draw a ring around the correct answer to complete each sentence.

1 (a) To build cells we need large amounts of

mineral ions.
proteins.
vitamins.

(1 mark)

1 (b) Too much fat in the diet can lead to

heart disease.
leprosy.
lung cancer.

(1 mark)

1 (c) Too much salt in the diet can lead to

arthritis.
diabetes.
high blood pressure.

(1 mark)

1 (d) Not eating enough food can lead to

diabetes.
irregular periods.
leprosy.

(1 mark)

4

4.2.2.7 Cancer

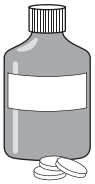
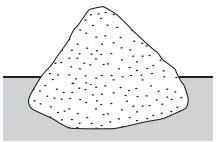
Question 09

3 Drugs affect our bodies.

3 (a) **List A** gives the names of four different substances.

List B gives information about different substances.

Draw **one** line from each substance in **List A** to the correct information about the substance in **List B**.

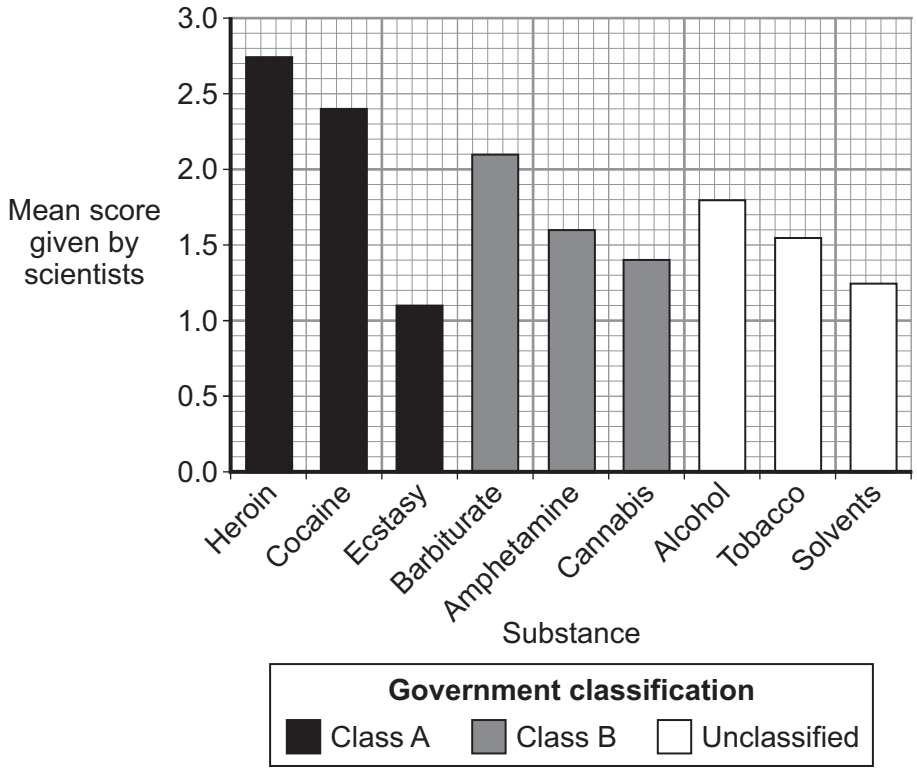
List A Substance	**List B Information**
Alcohol 	Used to treat bacterial diseases
Antibiotic 	A very addictive drug
Heroin 	May cause lung cancer
Cigarette smoke 	May cause babies to be born with abnormal limbs
	May cause liver disease

(4 marks)

4.2.2.7 Cancer

Question 09 · continued

3 (b) A group of scientists was asked to say how much harm recreational drugs cause.
The scientists used a scale of 1–3, with 3 being the most harmful.
Their results are shown on the graph.
The government classifies drugs into three groups.
The groups are shown in the key below the graph.



3 (b) (i) Name the drug which **scientists** think is least harmful.

.....

(1 mark)

3 (b) (ii) In the government classification, class A drugs are the most harmful and unclassified drugs are the least harmful.

Does the government classification agree with the scientists' classification for **all** the drugs?

Draw a ring around your answer. **Yes / No**

Give **one** piece of evidence from the graph to support your answer.

.....

.....

(1 mark)

Question 3 continues on the next page

4.2.2.7 Cancer

Question 09 · continued

3 (c) Draw a ring around the correct answer to complete the sentence.

People use recreational drugs

- to cure disease.
- to prevent diseases.
- for pleasure.

(1 mark)

7

4.2.2.7 Cancer

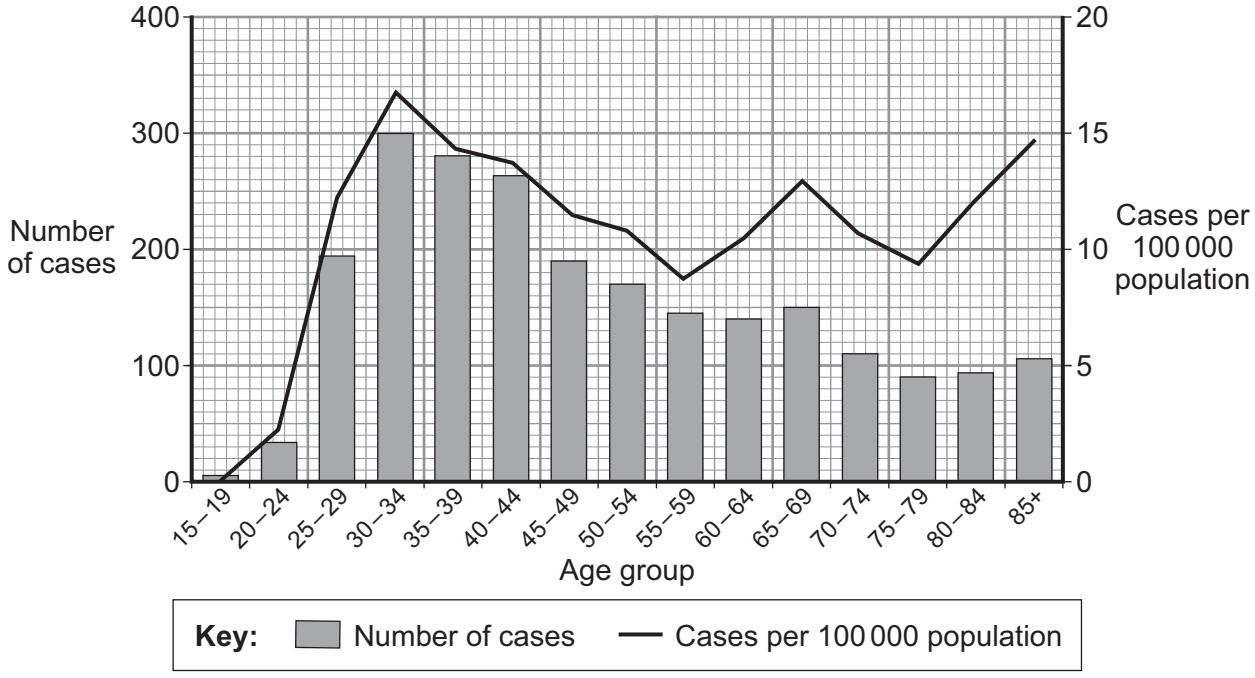
Question 10

June 2011 | BLY1AP | Original Q9 | Legacy

QUESTION NINE

A virus causes cervical cancer. Sexual intercourse transmits the virus.

The graph shows the number of cases of cervical cancer diagnosed in England in 2005.



9A Which age group had the highest number of cases of cervical cancer?

1 15–19

2 30–34

3 40–44

4 85+

9B A city has 500 000 inhabitants.

How many women aged 65–69 would have been diagnosed with cervical cancer in 2005?

1 13

2 65

3 150

4 260

4.2.2.7 Cancer

Question 10 · continued

9C The government has started a programme of vaccination against the cervical cancer virus. The programme starts with the vaccination of 14-year-old girls.

From the information in the graph, what is the reason for starting with this age group?

The girls in this age group . . .

1 are used to being vaccinated.

2 get booster doses of other vaccines at school.

3 have mainly not yet started their menstrual cycles.

4 have mainly not yet been infected with the virus.

9D Many parents do not agree with girls of 14 being vaccinated against the cervical cancer virus.

An ethical reason for this would be that the parents . . .

1 think vaccination might encourage the girl to have underage sex.

2 do not know how the vaccine works.

3 are afraid of side-effects.

4 cannot afford vaccination.

END OF TEST

4.2.2.7 Cancer

Question 11

June 2012 | BL1FP | Original Q5 | Legacy

5 Thalidomide is a drug that was developed in the 1950s.
In the 1950s some pregnant women took thalidomide to prevent morning sickness during pregnancy.

Today, thalidomide is **not** used to prevent morning sickness.

5 (a) (i) Give **one** medical use of thalidomide, today.

.....

.....

(1 mark)

5 (a) (ii) Today, before a woman is given thalidomide, she is

- checked to see if she is pregnant
- told to use two different methods of contraception at the same time.

Give the reason why:

the woman is checked to see if she is pregnant

.....

.....

the woman is told to use two different methods of contraception at the same time

.....

.....

(2 marks)

5 (b) The information is about two types of contraceptive pill used by women.

Combined pill

- contains two hormones
- is taken for 21 days, then no pills are taken for 7 days
- > 99% effective at preventing pregnancy
- increases chance of headaches
- increases chance of breast cancer
- decreases chance of cancer of the ovary

Mini-pill

- contains one hormone
- must be taken at the same time every day
- < 99% effective at preventing pregnancy
- increases chance of breast cancer

4.2.2.7 Cancer

Question 11 · continued

5 (b) (i) Which **two** hormones does the combined pill contain?

Draw a ring around **two** answers.

LH **oestrogen** **progesterone** **FSH**

(2 marks)

5 (b) (ii) Give **two** advantages of taking the combined pill and **not** the mini-pill.

.....

.....

.....

.....

(2 marks)

5 (b) (iii) Give **one** advantage of taking the mini-pill and **not** the combined pill.

.....

.....

(1 mark)

8

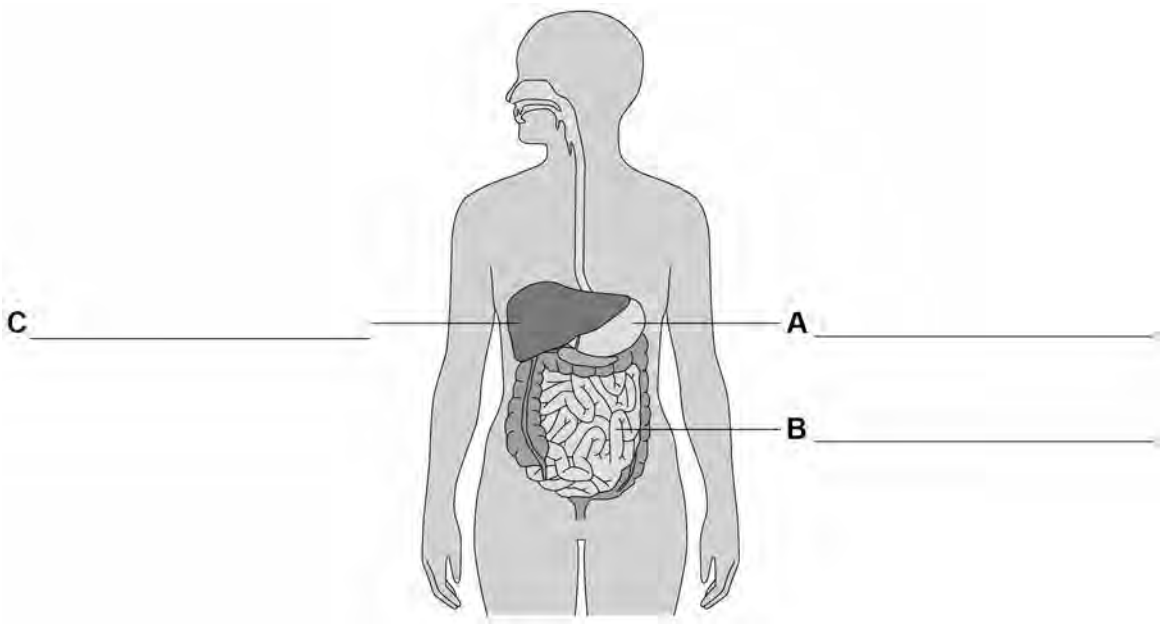
4.2.2.7 Cancer

Question 12

June 2018 | 8461/1F | Original Q3

0 3 **Figure 5** shows the human digestive system.

Figure 5



0 3 . 1 Label organs **A**, **B** and **C**.

[3 marks]

0 3 . 2 Complete the sentences.

[3 marks]

Choose the answers from the box.

catalyse	**denatured**	**digest**	**energise**
excreted	**ingested**	**insoluble**	**soluble**

Digestion is the process of breaking down large food molecules into smaller molecules that are _____.

Enzymes help to break down food because they _____ chemical reactions.

If the temperature of an enzyme gets too high, the enzyme is _____.

4.2.2.7 Cancer

Question 12 · continued

0 3 . 3 Protease is an enzyme.

Protease breaks down protein.

What is protein broken down into?

[1 mark]

Tick **one** box.

- Amino acids ☐
- Fatty acids ☐
- Glucose ☐
- Glycerol ☐

0 3 . 4 Why is protein needed by the body?

[1 mark]

_____

_____

0 3 . 5 Which organ in the human digestive system produces protease?

[1 mark]

Tick **one** box.

- Gall bladder ☐
- Large intestine ☐
- Liver ☐
- Stomach ☐

Question 12 · continued

0 3 . 6 Describe how you would test a sample of food to show it contains protein.

Give the reason for any safety precautions you would take.

[4 marks]

0 3 . 7 Complete the sentence.

[1 mark]

Choose the answer from the box.

fat	fibre	minerals	vitamins

Obesity can be caused by a diet high in _____.

0 3 . 8 Complete the sentence.

[1 mark]

Choose the answer from the box.

skin cancer	type 1 diabetes	type 2 diabetes

Obesity is a risk factor for _____.

15

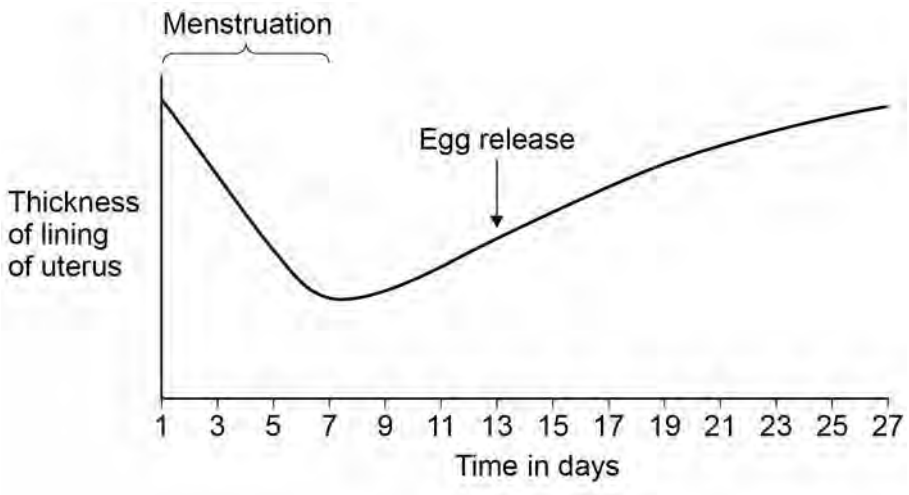
4.2.2.7 Cancer

Question 13

June 2018 | 8461/2F | Original Q2

0 2 **Figure 2** shows some changes that occur during the menstrual cycle.

Figure 2



0 2 . 1 **Figure 2** shows that the lining of the uterus thickens between days 7 and 27.

What is the purpose of thickening the lining of the uterus?

[1 mark]

Tick **one** box.

To allow implantation of the embryo ☐

To break down waste ☐

To prevent sperm reaching the egg ☐

0 2 . 2 Which hormone causes thickening of the lining of the uterus?

[1 mark]

Tick **one** box.

Auxin ☐

Oestrogen ☐

Testosterone ☐

4.2.2.7 Cancer

Question 13 · continued

0 2 . 3 On which day is fertilisation most likely to occur?

Use information from **Figure 2**.

[1 mark]

Contraception can be used to lower the chance of pregnancy.

0 2 . 4 Draw **one** line from each method of contraception to how the method works.

[3 marks]

Method of contraception	How the method works
Contraceptive pill	Barrier to prevent sperm reaching the egg
Diaphragm	Contains hormones to stop eggs maturing
Spermicidal cream	Kills sperm
	Slows down sperm production

Question 2 continues on the next page

4.2.2.7 Cancer

Question 13 · continued

0 2 . 5 **Table 2** gives information about some different methods of contraception.

Table 2

Method	Number of pregnancies per 100 women in one year	Possible Side effects
Diaphragm and spermicidal cream	8	Usually none, but can cause bladder infection in some women
Condom	2	None
Contraceptive pill	1	Mood swings, headaches, high blood pressure, blood clots, breast cancer

A man and a woman decide to use the condom as their method of contraception.

Suggest **three** reasons for this decision.

Use information from **Table 2** and your own knowledge.

[3 marks]

1 _____

_____

2 _____

_____

3 _____

_____

9

4.2.2.7 Cancer

Question 14

November 2020 | 8461/2F | Original Q7

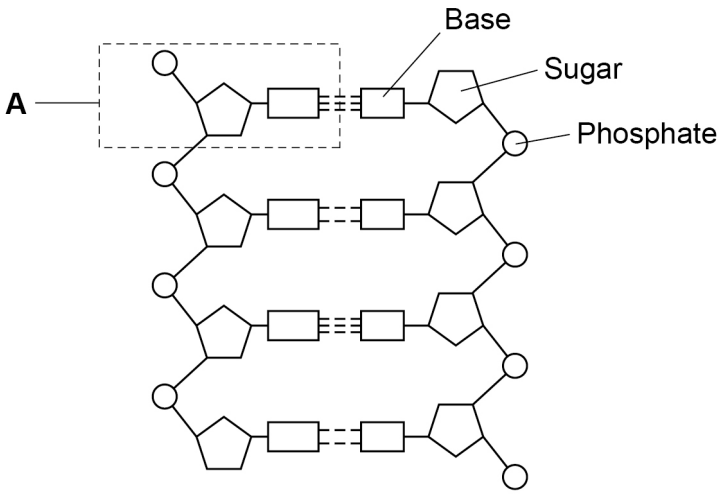
0 7 This question is about DNA.

0 7 . 1 Describe the shape of a DNA molecule.

[2 marks]

Figure 10 shows part of a DNA molecule.

Figure 10



0 7 . 2 DNA codes for a sequence of amino acids.

Which part of DNA forms the code for a particular amino acid?

[1 mark]

Tick (✓) **one** box.

- Bases ☐
- Phosphates ☐
- Sugars ☐

4.2.2.7 Cancer

Question 14 · continued

0 7 . 3 Which substance is produced when amino acids are joined together?

[1 mark]

Tick (✓) **one** box.

- Carbohydrate ☐
- Fat ☐
- Protein ☐

0 7 . 4 DNA is made of repeating units. One of the units is labelled **A** in **Figure 10**.

What is the name of the repeating unit labelled **A**?

[1 mark]

Tick (✓) **one** box.

- Chromosome ☐
- Enzyme ☐
- Nucleotide ☐

Question 7 continues on the next page

Question 14 · continued

0 7 . 5 The DNA in one human body cell is the length of 6 000 million repeating units (part **A**).

Each repeating unit is 0.34 nanometres (nm) long.

Calculate the length of the DNA in the cell in millions of nanometres.

[2 marks]

Length = _____ million nm

0 7 . 6 Give your answer to Question **07.5** in metres.

1 metre = 1×10^9 nanometres

[1 mark]

Length = _____ m

0 7 . 7 DNA analysis can show people which alleles they have.

Patients who have certain types of cancer can be offered DNA analysis.

The family of the patient can also be offered DNA analysis.

Suggest **one** advantage of having DNA analysis.

[1 mark]

9

4.2.2.7 Cancer

Question 15

June 2023 | 8461/1F | Original Q2

0 2 Viruses cause disease.

0 2 . 1 What name is given to microorganisms that cause disease?

[1 mark]

Tick (✓) **one** box.

Pathogens ☐

Predators ☐

Producers ☐

0 2 . 2 The body has defences to stop viruses entering.

Draw **one** line from each defence to the part of the body that provides the defence.

[2 marks]

Defence	**Part of the body that provides the defence**
	Brain
A physical barrier that stops viruses entering	Heart
Mucus that traps viruses	Nose
	Skin

Question 15 · continued

Some viruses can cause tumours to develop.

0 2 . 3 Complete the sentence.

Choose the answer from the box.

[1 mark]

digestion	division	metabolism

A tumour can form when changes to cells cause uncontrolled

cell _____.

0 2 . 4 Malignant tumours are cancers.

Which **two** sentences describe malignant tumours?

[2 marks]

Tick (✓) **two** boxes.

- Malignant tumours are only found in the reproductive system. ☐
- Malignant tumours contain digestive enzymes. ☐
- Malignant tumours do not change in size. ☐
- Malignant tumours have cells that can spread to other parts of the body. ☐
- Malignant tumours may form secondary tumours. ☐

Question 2 continues on the next page

Question 15 · continued

HPV is a virus that can cause one type of cancer in females.

In the UK since 2008, most 12 to 13-year-old females have been vaccinated against HPV.

Scientists investigated the percentage of 16 to 18-year-old females with HPV.

Table 2 shows the results.

Table 2

Year	Percentage (%) of 16 to 18-year-old females with HPV
2010	8.2
2012	3.2
2014	2.0
2016	1.6

0 2 . 5 What does **Table 2** show about the percentage of females with HPV from 2010 to 2016?

[1 mark]

0 2 . 6 Suggest the reason for the change you described in Question **02.5**.

[1 mark]

4.2.2.7 Cancer

Question 15 · continued

The HPV vaccine contains an inactive form of the virus.

The inactive form of the virus is injected into the body.

0 2 . 7 Which part of the blood responds to the inactive virus?

[1 mark]

Tick (✓) **one** box.

- Platelets ☐
- Red blood cells ☐
- White blood cells ☐

0 2 . 8 What is produced by the body in response to the inactive virus?

[1 mark]

Tick (✓) **one** box.

- Antibiotics ☐
- Antibodies ☐
- Antiseptics ☐

0 2 . 9 Suggest **one** reason why some **parents** refuse to allow their children to have the HPV vaccine.

Do **not** refer to the pain of the injection in your answer.

[1 mark]

_____

_____

11

4.2.2.7 Cancer

Question 16

June 2024 | 8461/1F | Original Q5

0 5 Cancer occurs when there is uncontrolled cell division.

0 5 . 1 Which **two** factors can cause cancer?

[2 marks]

Tick (✓) **two** boxes.

- Antibiotics ☐
- Ionising radiation ☐
- Monoclonal antibodies ☐
- Salmonella ☐
- Viruses ☐

0 5 . 2 What type of cell division occurs in cancerous cells?

[1 mark]

Tick (✓) **one** box.

- Binary fission ☐
- Fertilisation ☐
- Mitosis ☐

4.2.2.7 Cancer

Question 16 · continued

0 5 . 3 Complete the sentences.

Choose answers from the box.

[2 marks]

decrease	**fertilise**	**grow**	**replicate**

Before a cell divides, the cell needs to _____.

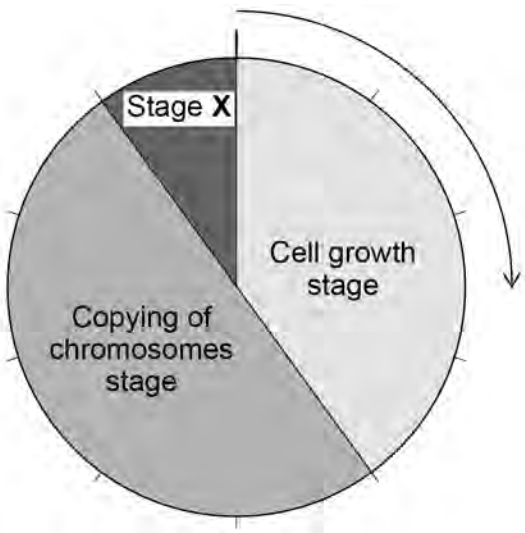
Before a cell divides, the DNA in the nucleus needs to _____.

Question 5 continues on the next page

Question 16 · continued

Figure 4 shows the cell cycle.

Figure 4



0 5 . 4 What percentage of the time taken for the cell cycle does the cell growth stage take?

Use **Figure 4**.

[1 mark]

Tick (✓) **one** box.

10% ☐ 20% ☐ 40% ☐ 90% ☐

0 5 . 5 What happens during stage **X** of the cell cycle in **Figure 4**?

[1 mark]

Tick (✓) **one** box.

Chromosomes are pulled to each end of the cell. ☐

The cell increases in size and mass. ☐

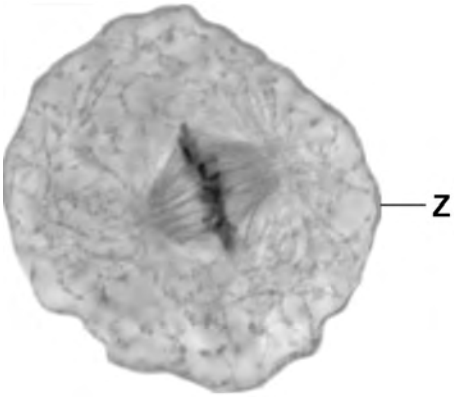
The number of mitochondria increases. ☐

4.2.2.7 Cancer

Question 16 · continued

Figure 5 shows an animal cell during cell division.

Figure 5



0 5 . 6 Name structure **Z** in **Figure 5**.

[1 mark]

Question 5 continues on the next page

4.2.2.7 Cancer

Question 16 · continued

0 5 . 7 The image of the cell in **Figure 5**:

- is magnified 800 times
- has a width of 50 mm.

Calculate the real width of the cell in **Figure 5**.

Give your answer in micrometres (µm).

Use the equation:

$$\text{real width of cell} = \frac{\text{width of image of cell}}{\text{magnification}}$$

1 mm = 1000 µm

[3 marks]

Real width of cell = _____ µm

4.2.2.7 Cancer

Question 16 · continued

Some drugs can treat cancer.

0 5 . 8 Complete the sentences.

Choose answers from the box.

[2 marks]

cells	**people**	**plants**	**viruses**

Preclinical testing of cancer drugs is done using _____.

To check if the drug is safe, the drug is tested on _____.

0 5 . 9 In drug trials some patients are given a tablet which does **not** contain the drug.

What name is given to the tablet that does **not** contain the drug?

[1 mark]

_____

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