AQA GCSE Biology | 8461

SPECIFICATION POINT 4.2.2.7

# Cancer

## Mark schemes and examiner comments

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

## Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

**Name:** _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

### 4.2.2.7 Cancer

**Answer 01 · Mark scheme**

March 2007 | BLY1A | Original Q9 | Legacy

| | | | | |
|---|---|---|---|---|
| Nine | **2** | **4** | **1** | **2** |

**4.2.2.7 Cancer**

**Answer 01 · Mark scheme**



## **BLY1A (Human Biology)** Higher Tier

| Question | Key | | |
|---|---|---|---|
| One | **A** | antibiotics | **1** |
| | **B** | natural selection | **3** |
| | **C** | pandemic | **4** |
| | **D** | resistance | **2** |
| | | | |
| Two | **A** | may cause damage to the liver and brain | **2** |
| | **B** | may cause less oxygen to be carried by the blood | **1** |
| | **C** | may cause withdrawal symptoms | **3** |
| | **D** | may lead to becoming addicted to a hard drug | **4** |

| | A | B | C | D |
|---|---|---|---|---|
| Three | **4** | **1** | **2** | **4** |
| Four | **2** | **4** | **1** | **2** |
| Five | **4** | **3** | **3** | **1** |
| Six | **2** | **3** | **3** | **3** |
| Seven | **3** | **3** | **4** | **2** |
| Eight | **2** | **4** | **2** | **1** |
| Nine | **2** | **2** | **2** | **2** |

### 4.2.2.7 Cancer

**Answer 02 · Mark scheme**

November 2007 | BLY1A | Original Q6 | Legacy

| | | | |
|---|---|---|---|
| Six | **A** | a hypothesis | **1** |
| | **B** | a survey | **4** |
| | **C** | an independent variable | **3** |
| | **D** | an observation | **2** |

| | A | B | C | D |
|---|---|---|---|---|

**Answer 03 · Mark scheme**

June 2008 | BLY1AP | Original Q8 | Legacy

| | | | | |
|---|---|---|---|---|
| Eight | **2** | **2** | **2** | **2** |

**Answer 04 · Mark scheme**

March 2009 | BLY1AP | Original Q3 | Legacy

| | | | |
|---|---|---|---|
| Three | **A** | alcohol | **2** |
| | **B** | cocaine | **4** |
| | **C** | tobacco | **1** |
| | **D** | thalidomide | **3** |

4.2.2.7 Cancer

Answer 05 · Mark scheme

June 2009 | BLY2F | Original Q5 | Legacy

## Question 5

| question | answers | extra information | mark |
|---|---|---|---|
| **5**(a) | chromosomes | | 1 |
| **5**(b) | diagram showing four separate chromosomes two long and two short (as in diagram 1) | allow each chromosome shown as two joined chromatids<br>do **not** allow if chromosomes touching each other | 1 |
| **5**(c)(i) | any **two** from:<br>• can grow into any type of tissue / named tissue<br>• used in medical research<br>• used to treat human diseases<br>• large numbers can be grown | | 2 |
| **5**(c)(ii) | any **two** from:<br>• expensive<br>• grow out of control / ref cancers<br>• may be rejected<br>• need for drugs (for rest of life) | | 2 |
| **Total** | | | **6** |

### 4.2.2.7 Cancer

**Answer 05 · Mark scheme**

June 2009 | BLY2F | Original Q5 | Legacy

**BLY2F**

4.2.2.7 Cancer

Answer 06 · Mark scheme

June 2009 | BLY3F | Original Q5 | Legacy

## Question 5

| question | answers | extra information | mark |
|---|---|---|---|
| **5**(a)(i) | bacteria | | 1 |
| **5**(a)(ii) | 8 | | 1 |
| **5**(a)(iii) | 4 tonnes | | 1 |
| **5**(b)(i) | mycoprotein contains less fat<br>**or**<br>less circulatory problems<br>mycoprotein contains (more) fibre<br>**or**<br>reduces colon cancer | it = mycoprotein<br>fat must be comparative | 1<br><br><br><br>1 |
| **5**(b)(ii) | beef contains <u>more</u> protein<br>**or**<br><u>better</u> for growth / making cells /<br>enzymes / antibodies | it = beef<br>must be comparative | 1 |
| **Total** | | | **6** |

### 4.2.2.7 Cancer

**Answer 06 · Mark scheme**

June 2009 | BLY3F | Original Q5 | Legacy

**BLY3F**

**Answer 07 · Mark scheme**

November 2009 | BLY1AP | Original Q5 | Legacy

No matching mark scheme was available in the supplied archive for this question.

4.2.2.7 Cancer

Answer 08 · Mark scheme

June 2010 | BLY1F | Original Q1 | Legacy

## Question 1

| question | answers | extra information | mark |
|---|---|---|---|
| **1**(a) | proteins | | 1 |
| **1**(b) | heart disease | | 1 |
| **1**(c) | high blood pressure | | 1 |
| **1**(d) | irregular periods | | 1 |
| **Total** | | | **4** |

### 4.2.2.7 Cancer

**Answer 08 · Mark scheme**

June 2010 | BLY1F | Original Q1 | Legacy

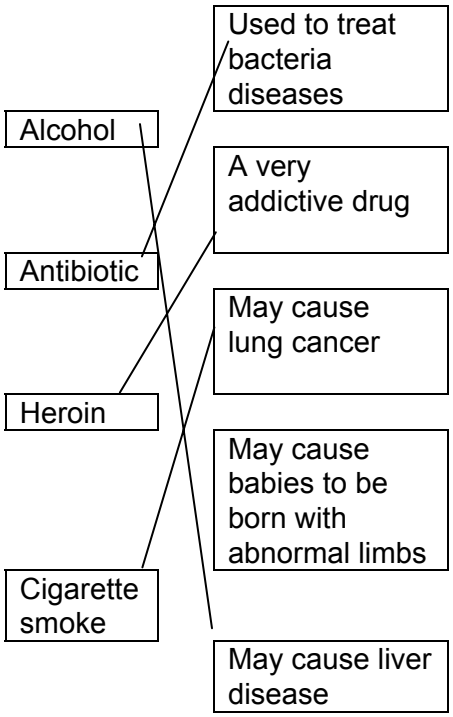
**BLY 1F**

4.2.2.7 Cancer

Answer 09 · Mark scheme

January 2011 | BLY1F | Original Q3 | Legacy

## Question 3

| question | answers | extra information | mark |
|---|---|---|---|
| 3(a) |  | **1** mark for each correct line<br>mark each line from left hand box<br>two lines from left hand box cancels mark for that box | 4 |
| 3(b)(i) | ecstasy | | 1 |
| 3(b)(ii) | (no)<br>any **one** correct difference<br>eg Ecstasy in Class A but least harmful according to scientists | accept reference to figures | 1 |
| 3(c) | for pleasure | | 1 |
| **Total** | | | **7** |

### 4.2.2.7 Cancer

**Answer 09 · Mark scheme**

January 2011 | BLY1F | Original Q3 | Legacy

**BLY1F**

**Answer 10 · Mark scheme**

June 2011 | BLY1AP | Original Q9 | Legacy

| | | | | |
|---|---|---|---|---|
| Nine | **2** | **2** | **4** | **1** |

4.2.2.7 Cancer

Answer 11 · Mark scheme

June 2012 | BL1FP | Original Q5 | Legacy

## Question 5

| question | answers | extra information | mark |
|---|---|---|---|
| 5 (a)(i) | any **one** from:<br>• as a sleeping pill<br>• treating leprosy | ignore cancer / AIDS<br>do **not** accept morning sickness | 1 |
| 5 (a)(ii) | thalidomide causes birth defects / abnormalities / described<br>to be (more) sure of not getting pregnant | in this order<br>ignore kill / harm / damage baby<br>allow to be certain there is no baby **or** in case one doesn't work | 1<br>1 |
| 5 (b)(i) | oestrogen<br>progesterone | | 1<br>1 |
| 5 (b)(ii) | any **two** from:<br>• reduce chances of <u>ovarian</u> cancer<br>• <u>more</u> effective (in preventing pregnancy)<br>• no pills (to remember) for 7 days (out of every 28)<br>• doesn't have to be taken at the same time every day | allow only taken for 21 days (out of 28) | 2 |
| 5 (b)(iii) | less chance of headaches<br>**or**<br>less chance of forgetting | ignore won't get headaches<br>allow lower dose of hormone<br>allow fewer side effects<br>ignore only contains one hormone | 1 |
| **Total** | | | **8** |

### 4.2.2.7 Cancer

**Answer 11 · Mark scheme**

June 2012 | BL1FP | Original Q5 | Legacy

**BL1FP**

4.2.2.7 Cancer

Answer 12 · Mark scheme



| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 03.1 | (A) stomach | | 1 | AO1 4.2.2.1 |
| | (B) small intestine | allow ileum<br>ignore intestine unqualified | 1 | |
| | (C) liver | | 1 | |
| 03.2 | soluble | this order only | 1 | AO1 4.2.2.1 |
| | catalyse | | 1 | |
| | denatured | | 1 | |
| 03.3 | amino acids | | 1 | AO1 4.2.2.1 |
| 03.4 | any **one** from:<br>• for growth<br>• for repair / replacement (of cells / tissues / organs) | allow for enzymes / hormones / antibodies<br>allow to strengthen bones<br>ignore for energy | 1 | AO1 4.2.2.1 |
| 03.5 | stomach | | 1 | AO1 4.2.2.1 |

4.2.2.7 Cancer

Answer 12 · Mark scheme

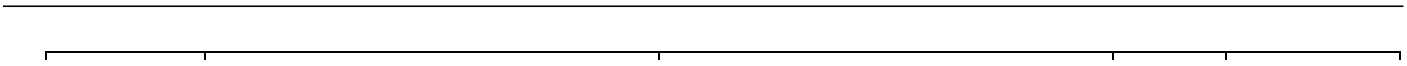
June 2018 | 8461/1F | Original Q3

| Question | Answers | Mark | AO / Spec. Ref. |
|---|---|---|---|
| 03.6 | **Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account. | 3–4 | AO1 4.2.2.1 |
| | **Level 1:** Facts, events or processes are identified and simply stated but their relevance is not clear. | 1–2 | |
| | **No relevant content** | 0 | |
| | **Indicative content**<br>• grinding up the food<br>• add Biuret reagent (allow $CuSO_4$ and NaOH) to food (sample)<br>• protein turns solution (from blue) to purple / lilac<br>• wear goggles to protect eyes<br>• clean up spills immediately<br>• Biuret / NaOH is an irritant / corrosive / poisonous<br>for **level 2** a reference to Biuret, a positive result and reason for a safety precaution is required | | |
| 03.7 | fat | 1 | AO1 4.2.2.1 |
| 03.8 | type 2 diabetes | 1 | AO1 4.2.2.6 |
| Total | | 15 | |

### 4.2.2.7 Cancer

**Answer 12 · Mark scheme**

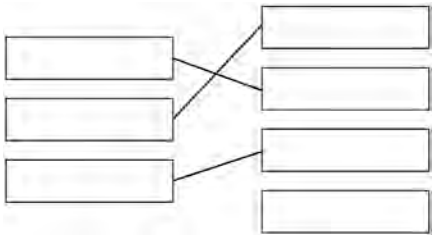
June 2018 | 8461/1F | Original Q3



4.2.2.7 Cancer

Answer 13 · Mark scheme

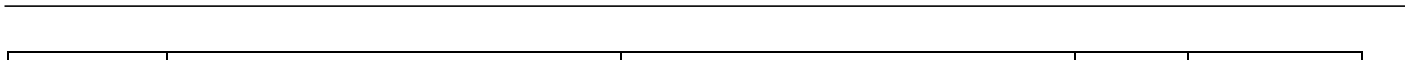
June 2018 | 8461/2F | Original Q2

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 02.1 | to allow implantation of the embryo | | 1 | AO1 4.5.3.4 |
| 02.2 | oestrogen | | 1 | AO1 4.5.3.4 |
| 02.3 | 13 / 14 / 15 / 16 | allow any number in range 13 to 16<br>allow any range within these values eg 14–16 | 1 | AO3 4.5.3.5 |
| 02.4 |  | extra line from a method cancels the mark | 1<br>1<br>1 | AO1 4.5.3.5 |
| 02.5 | more reliable than diaphragm / spermicidal cream<br><br>low chance of pregnancy<br><br><br><br>no side effects | allow fewer pregnancies than diaphragm / spermicidal cream<br><br>allow only 1 more pregnancy than the pill (per 100 women per year)<br><br>allow almost as good as the pill<br><br>allow reference to one named example<br><br>allow easy to get / buy<br><br>allow easy to use<br><br>allow prevent / reduce spread of STDs / gonorrhoea / HIV<br><br>ignore cost | 1<br><br>1<br><br><br><br>1 | AO3 4.5.3.5 |
| Total | | | 9 | |

### 4.2.2.7 Cancer

**Answer 13 · Mark scheme**

June 2018 | 8461/2F | Original Q2



4.2.2.7 Cancer

Answer 14 · Mark scheme

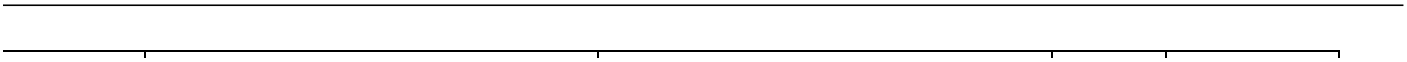
November 2020 | 8461/2F | Original Q7

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **07.1** | any **two** from:<br>• double<br>• helix<br>• long / thin | allow two strands<br>allow twisted / spiral / coiled | 2 | AO1<br>4.6.1.4 |
| **07.2** | bases | | 1 | AO1<br>4.6.1.5 |
| **07.3** | protein | | 1 | AO1<br>4.6.1.4<br>4.6.1.5 |
| **07.4** | nucleotide | | 1 | AO1<br>4.6.1.5 |
| **07.5**<br>**mark with 07.6** | 0.34 × 6 000<br><br>2040 (million nm) | | 1<br><br>1 | AO2<br>4.6.1.4<br>4.6.1.5 |
| **07.6**<br>**mark with 07.5** | answer from question **07.5** correctly converted | if no answer to question **07.5**, allow 2.04 (m) | 1 | AO2<br>4.6.1.4<br>4.6.1.5 |
| **07.7** | any **one** of:<br>• to determine if the cancer is genetic (or caused by lifestyle factors)<br>• to inform / help treatment<br>• to allow embryo screening to ensure allele is not passed on<br>• to inform relatives if they have inherited (affected) gene / allele<br>• to detect cancer early **or** before symptoms show<br>• to understand cause of the cancer | | 1 | AO3<br>4.6.1.7<br>4.2.2.7 |
| **Total** | | | **9** | |

### 4.2.2.7 Cancer

**Answer 14 · Mark scheme**

November 2020 | 8461/2F | Original Q7



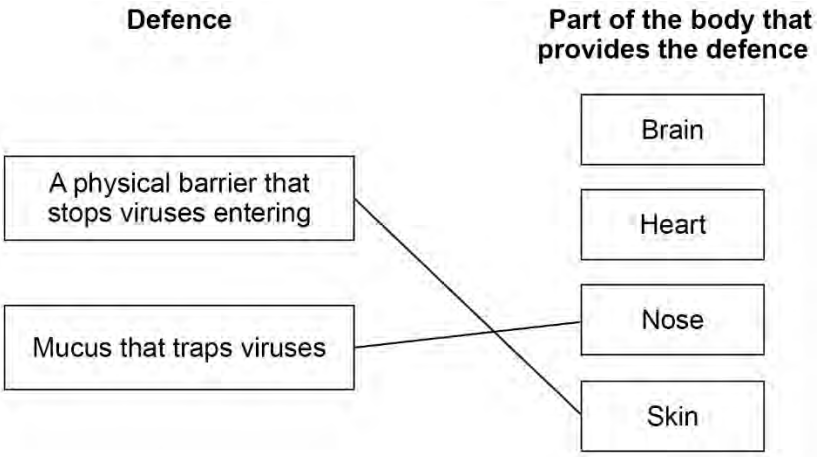
4.2.2.7 Cancer

Answer 15 · Mark scheme

June 2023 | 8461/1F | Original Q2

## Question 2

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 02.1 | pathogens | | 1 | AO1 4.3.1.1 |

| Question | Answers | Mark | AO / Spec Ref. |
|---|---|---|---|
| 02.2 | <br>do **not** accept more than one line from a box on the left | 1<br>1 | AO1 4.3.1.6 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 02.3 | division | | 1 | AO1 4.2.2.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 02.4 | malignant tumours have cells that can spread to other parts of the body<br>malignant tumours may form secondary tumours | | 1<br>1 | AO1 4.2.2.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 02.5 | (percentage) decreases | | 1 | AO3 4.2.2.7 4.2.2.5 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **02.6** | more females were vaccinated (over time) | allow males may also be vaccinated<br>allow more people were vaccinated<br>allow increased use of (named) barrier methods of contraception<br>allow more awareness / education (about HPV) | 1 | AO3<br>4.2.2.7<br>4.2.2.5 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **02.7** | white blood cells | | 1 | AO1<br>4.3.1.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **02.8** | antibodies | | 1 | AO1<br>4.3.1.7<br>4.3.1.6 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **02.9** | any **one** from:<br>• people are afraid of side / unknown effects<br>• religious / cultural objections<br>• (some people) believe they don't work<br>• some people think (HPV) vaccine encourages sexual activity | ignore pain of injection<br>allow there are side effects<br>allow people think they cause (named) disease<br>ignore religion unqualified<br>ignore moral / ethical objections | 1 | AO3<br>4.3.1.7 |

| Total Question 2 | 11 |
|---|---|

4.2.2.7 Cancer

Answer 16 · Mark scheme

June 2024 | 8461/1F | Original Q5

## Question 5

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.1 | ionising radiation<br><br>viruses | | 1<br><br>1 | AO1<br>4.2.2.5<br>4.2.2.6 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.2 | mitosis | | 1 | AO1<br>4.2.2.7<br>4.1.2.2 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.3 | grow<br><br>replicate | must be in this order | 1<br><br>1 | AO1<br>4.1.2.2 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.4 | 40% | | 1 | AO2<br>4.1.2.2 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.5 | chromosomes are pulled to each end of the cell | | 1 | AO2<br>4.1.2.2 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.6 | (cell) membrane | | 1 | AO2<br>4.1.1.2 |

4.2.2.7 Cancer

Answer 16 · Mark scheme



| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.7 | $\frac{50}{800}$<br>0.0625 (mm)<br>62.5 (µm) | allow conversion to µm at any stage in the calculation<br><br>allow correct conversion from student's incorrect calculation | 1<br>1<br>1 | AO2 4.1.1.5 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.8 | cells<br>people | must be in this order | 1<br>1 | AO1 4.3.1.9 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 05.9 | placebo | allow placebo effect<br>ignore examples and descriptions of placebos | 1 | AO1 4.3.1.9 |

| Total Question 5 | 14 |
|---|---|

4.2.2.7 Cancer

Answer 14 · Examiner comments

November 2020 | 8461/2F | Original Q7

**Question 7 (low & standard demand)**

This question was about DNA. In **07.1** many students knew the term ‘double helix’ and gained both of the available marks. Other students attempted to describe the figure lower down on the page, but usually did so in terms of the labelled components of the structure. Various acceptable terms were used as synonyms for ‘helix’.

For **07.5** all sorts of mathematical manipulations were carried out with the two numbers in the question. Although these often correctly involved multiplication, the values were sometimes written down incorrectly or the million in the question was interpreted as thousands or billions or anything in between. Consequently, the correct answer was not commonly given. The answer line showed that it was unnecessary to expand the millions in the question, although many attempted to do so. In **07.6** many students carried out further calculations with no reference to the answer they had given in the previous part, introducing all sorts of numbers with no evidence as to their origin. Some multiplied by a factor of $10^9$, whilst others omitted the millions in question 07.5 and simply divided what they had written by $10^9$.

4.2.2.7 Cancer

Answer 15 · Examiner comments

June 2023 | 8461/1F | Original Q2

**Question 2 (Low demand)**

**02.1** Nearly all students were able to determine 'pathogens' as being the name given to microorganisms that cause disease.

**02.2** Almost 90% of students correctly linked both defences to the part of the body that provided the defence. Students should be reminded that they must not draw more than one line from a box on the left in these questions, as this will not gain credit.

**02.3** A pleasing 90% of students knew that a tumour can form when changes to cells cause uncontrolled cell division**.**

**02.4** Students have a clear understanding of features of malignant tumours, and indeed only around 4% of students gained zero marks on this question. Almost two thirds of students gained both available marks.

**02.5** Over 95% of students gained this mark. A number went on to use data in support of their statements but this was not necessary. Some simply said that Table 2 showed that 'the vaccine had worked', but as the question asked specifically about how the **percentage** of females with HPV had changed, no credit could be given.

**02.6** Surprisingly, only around 42% of students could suggest a correct reason for the change in HPV cases from 2010-2016. Many of these students correctly referred to more females, and sometimes more males as well, being vaccinated. Those failing to gain credit however, often simply stated 'vaccination' as the reason but gave no idea as to why the percentage continued to fall over time.

**02.7** Nearly 80% of students knew that white blood cells respond to an inactive virus, and gained the mark.

**02.8** While the most common incorrect answer was 'antibiotics', it was pleasing to see over 93% of students correctly identifying antibodies as being produced in response to the inactive virus.

**02.9** Most credited responses here were around concerns of side effects from the vaccine and this was expressed in many different ways. Around 60% were in fact successful in gaining the mark. Reference to 'anti-vax' parents was seen but unless qualified as to the reason behind refusal to vaccinate it failed to gain a mark. Many students correctly quoted religious or cultural objections although, 'religion' or 'beliefs' on their own were insufficient. The idea that the vaccine might simply not work was commonly credited but answers such as 'parents are scared of the vaccine' or 'it's too expensive' gained no marks.

4.2.2.7 Cancer

Answer 16 · Examiner comments

June 2024 | 8461/1F | Original Q5

**Question 5 (low and standard demand)**

**05.1** 73% of students scored one mark in this question, in comparison to 24% who scored two marks. The most common incorrect response was the selection of monoclonal antibodies rather than viruses. Students should be reminded to check the instructions given at the start of the question, as a minority only ticked one box, rather than two.

**05.2** 48% of students correctly identified mitosis as being the type of cell division occurring in cancer cells. The majority of incorrect responses were for binary fission.

**05.3** 69% of students achieved two marks in this question, but it was clear from the number of answer changes that many had deliberated over their responses to this question. Students should be reminded that if they change their minds in any question, they should clearly cross out and rewrite their answers rather than relying on unclear arrows which may possibly be misinterpreted.

**05.4** 86% of students answered this question correctly.

**05.5** 66% of students answered this question correctly.

**05.6** 53% of students gave the correct answer. Many students found identifying the cell membrane from a cell photograph more difficult than from a diagram. The context of cell division led some to give 'egg cell' or 'zygote' and others to suggest the 'nucleus' in their answer. Other incorrect responses included 'cell wall' despite the fact that the picture was of an animal cell.

**05.7** In this calculation, which was well answered, nearly two thirds of students achieved full marks. Students were asked to calculate the real width of a cell using figures and an equation given in the question. Most students managed to complete the substitution step correctly although some used the figures the wrong way round. The further requirement to convert the answer obtained in millimetres into micrometres proved more difficult for some.

**05.8** Students were often uncertain about the correct choice of words in this question. Many believed that preclinical testing of cancer drugs should be carried out on people and that safety checks should be completed using plants. 28% of students achieved both marks in this question, and 34% achieved one mark.

**05.9** 54% of students were able to identify a placebo as being a tablet that does not contain an active drug. This question elicited a variety of responses including 'paracetamol', 'aspirin' and 'antibiotics' and no credit was given for descriptions alone. Phonetic spellings of the term were credited and seen frequently.

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