

**Name:**

**Biology Class:**

**Teacher: Mrs Masters**

**A-Level Biology**

**A03 Evaluation**

**Question Practice**

**MARKSCHEME**



**Question 1: AS Paper 1 2016 Q8**

08.3	<ol style="list-style-type: none"> <li>1. (No, because) at 100 there are still <b>some</b> (7%) cancer cells dividing/undergoing mitosis;</li> <li>2. So, cancer not destroyed/may continue to grow/spread/form tumours;</li> <li>3. Best concentration may be between 100 and 1000/need trials between 100 and 1000;</li> <li>4. This research in culture, don't know effect of KI on people;</li> <li>5. (Yes, because) above 100 produces little increase in % of cells not dividing/undergoing mitosis/at 100, <b>most</b> (93%) cancer cells unable to divide/dead;</li> <li>6. Above 100 may be harmful (to body);</li> <li>7. Higher concentrations more expensive;</li> <li>8. (above 100) will have more effect on (rapidly dividing) cancer cells;</li> </ol>	4 max	<ol style="list-style-type: none"> <li>1. Accept idea that all division stops only at 1000</li> <li>2. Must refer to cancer spreading not cells dividing</li>   <li>4. Reject 'not tested on humans'</li> <li>4. Reject 'done in animals'</li> <li>5. Must clearly link lack of monopolar mitotic spindles with cell division</li>   <li>6. Accept '<b>above 100/high concentrations</b> produce harmful side effects/named effects'</li>   <li>8. Must relate to 100</li> </ol>
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**Question 2: A-Level Paper 3 2017 Q2.5**

02.5	<ol style="list-style-type: none"> <li>1. (Bacteriophage) reduces number of bacteria;</li> <li>2. (In all cases/mice because) ranges don't overlap;</li> <li>3. But big range of effect/some mice a big reduction/a few mice with big falls in number</li> </ol> <p>OR</p> <p>Doesn't bring bacteria down to 0 in any/works for some (mice) but not for all;</p>	3	<p>Do not accept just quotes of <math>\log_{10}</math> figures direct from graph</p> <p>Ignore refs to significance</p> <p>2. Reject ref to SD / SE</p>
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**Question 3: A-Level Paper 3 2018 Q2.2**

<p><b>02.2</b></p>	<ol style="list-style-type: none"> <li>1. The more CD20 (on B cells), higher the percentage of / more B cells destroyed / more effective it is;</li> <li>2. (At best) only destroys (about) 80% of B cells <b>OR</b> In no cases are all B cells killed;</li> <li>3. Don't know % / proportion of cancer cells killed;</li> <li>4. Won't cure CLL / cancer / slows but doesn't stop CLL / cancer;</li> <li>5. Little effect below (about) 5 CD20 on cells;</li> </ol>	<p>3 max</p>	<ol style="list-style-type: none"> <li>1. Ignore ref. to 'positive correlation' unqualified</li> <li>Ignore ref. to correlation vs. causation</li> <li>Ignore ref. to effects on the immune system</li> <li>5. Ignore ref. to little effect where little CD20</li> </ol>
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**Question 4: AS Paper 1 2018 Q9.3**

<p><b>09.3</b></p>	<p><b>For</b></p> <ol style="list-style-type: none"> <li>1. Significantly higher concentrations of CO (compared with no smoking) with closed window (as no overlap in 2 x SD);</li> <li>2. Any increase in CO could be dangerous;</li> </ol> <p><b>OR</b></p> <p>CO causes less oxygen to be carried / provided (which could be deadly in children);</p> <ol style="list-style-type: none"> <li>3. (significantly) higher levels after (just) 5 minutes (with closed windows supporting short journey statement);</li> </ol> <p><b>Against</b></p> <ol style="list-style-type: none"> <li>4. No idea if (roughly) 5ppm is 'deadly';</li> <li>5. No significant difference with open window (as 2 x SD overlaps);</li> <li>6. No data on child breathing rates;</li> </ol> <p><b>OR</b></p> <p>Idea that children breathe faster but have smaller lung volume, so overall volume of CO inhaled could be similar;</p>	<p>4 max</p>	<ol style="list-style-type: none"> <li>1. Accept higher concentrations of CO with closed window are not due to chance</li> <li>1. and 3. Idea of higher is required, not just difference</li> <li>5. Accept difference with open window could be due to chance</li> </ol>
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**Question 5: A-level Paper 1 2019 Q2**

Question	Marking Guidance	Mark	Comments
2.2	<p>1. Negative <u>correlation</u> (between fibre eaten per day and risk of cardiovascular disease);</p> <p>2. Original/current fibre intake (of student) not known;</p> <p>3. (Idea of) significance linked to (2x) standard deviation overlap (at 10 g day<sup>-1</sup> change);</p> <p>4. If current intake between 5 and 30 (g day<sup>-1</sup>) then (eating 10g more results in a significant) decrease in risk</p> <p>OR</p> <p>If current intake between 30 and 50 (g day<sup>-1</sup>) then (eating 10g more results in) no significant decrease in risk;</p> <p>5. Correlation does not mean causation</p> <p>OR</p> <p>Another named factor may be involved;</p> <p>6. Little evidence/data for higher mass of fibre per day;</p> <p>7. Large (2x) standard deviation at high/low mass of fibre makes (mean) less precise</p> <p>OR</p> <p>Large (2x) standard deviation at high/low amounts of fibre means there is a greater uncertainty;</p> <p>8. No statistical test (to show if differences are significant);</p>	4 max	<p>1. Accept positive <u>correlation</u> with reduced risk</p> <p>2. Accept 'it depends on original/current fibre intake'.</p> <p>3. This is for the correct concept, ignore stated values.</p> <p>3. Ignore reference to probability and chance.</p> <p>4. Accept stated values between 5 and 30 for (significant) decrease in risk.</p> <p>4. Accept stated values between 30 and 50 for no significant decrease in risk.</p> <p>4. Ignore stated values less than 5 or more than 50.</p> <p>5. Examples of named factors - smoking, exercise, age, sex, genes, other aspects of diet.</p> <p>7. For 'precise' accept reliable or description of precise/reliable.</p>

Question	Marking Guidance	Mark	Comments
2.3	<p>(Advantage)</p> <p>1. Over longer period so more representative</p> <p>OR</p> <p>Diet over 24 hr may not be representative</p> <p>OR</p> <p>Diet may vary during the year/from day to day</p> <p>OR</p> <p>Person more likely to be honest on questionnaire (rather than speaking to nurse)</p> <p>OR</p> <p>More cost effective because fewer people/nurses required;</p> <p>(Disadvantage)</p> <p>2. Relies on (long term) memory so may not be accurate</p> <p>OR</p> <p>Recall of 24 hr diet likely to be more accurate</p> <p>OR</p> <p>Estimation (from FFQ) may be less accurate (than details of last 24hrs)</p> <p>OR</p> <p>Person may be more honest when being interviewed;</p>	2	<p>Only credit reference to 'honesty' once.</p> <p>2. For 'accurate' accept only 'valid' or 'close to true value'.</p> <p>2. Accept examples of 'estimation (from FFQ)' eg frequency of eating may not give mass of fibre, type of food may not give mass of fibre, no information on portion size to give mass of fibre. These must all be accompanied by idea of reduced accuracy.</p>

### Question 6: A-Level Paper 2 2019 Q4

04.1	<p>1. Lower (force of contraction) in mouse/B (than control/100%) below 29 °C</p> <p>OR</p> <p>Lower (force of contraction) in rabbit/D (than control/100%) below 26.5 °C;</p> <p>2. Higher (force of contraction) in mouse/B (than control/100%) above 29 °C</p> <p>OR</p> <p>Higher (force of contraction) in rabbit/D (than control/100%) above 26.5 °C;</p> <p>3. Only (used) mouse and rabbit</p> <p>OR</p> <p>No other organism/species used;</p> <p>4. Body temperature of mouse/rabbit higher (than temperatures investigated);</p> <p>5. Only used one/0.5 pH (below typical pH)</p> <p>OR</p> <p>(Should) use more pH values;</p> <p>6. (Used) isolated muscle tissue;</p> <p>7. No stats test to see if (difference is) significant;</p>	4 max	<p>1. Accept any temperature below 29 °C for mouse/B or any specified temperature below 26.5 °C for rabbit/D.</p> <p>2. Accept any temperature above 29 °C for mouse/B or any temperature above 26.5 °C for rabbit/D.</p> <p>1. and 2. Accept 27 °C for 26.5 °C and accept 28.5 °C for 29 °C.</p> <p>3. Accept only two animals/species used.</p> <p>4. Accept body temperature of mouse/rabbit not known</p> <p>7. Ignore SD.</p>
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**Question 7 A-level Paper 3 2019 Q5**

<p><b>05.1</b></p>	<p>Accept suitable null hypothesis that <b>includes type of light and behaviour</b>, eg The type of light has no effect on the behaviour/movement of COTS <b>OR</b> There is no difference in behaviour/movement with constant/flashing light;</p>	<p>1</p>	<p>Ignore general null hypotheses, or example 'there is no difference between observed and expected'</p>
<p><b>05.2</b></p>	<p>Accept any <b>two</b> factors for <b>one</b> mark from the list below; Salinity / salt concentration of the water Temperature (of the water) Amount / distribution of food pH (of the water) Oxygen/carbon dioxide concentration Intensity/wavelength of (constant and flashing) light</p>	<p>1 max</p>	<p>List rule applies Ignore humidity Ignore type of coral Ignore depth of water</p>
<p><b>05.3</b></p>	<p>Yes (no mark) 1. Movement is away from either type/both types of light <b>OR</b> Negative (photo) taxis to both types/either types of light; 2. Significant movement <u>away from</u> constant light <b>as</b> <math>p=0.02/&lt;0.05/=2%/&lt;5%</math> <b>OR</b> Movement <u>away from</u> constant light is not due to chance <b>as</b> <math>p=0.02/&lt;0.05/=2%/&lt;5%</math>; No (no mark) 3. Movement away from flashing light is not significant <b>as</b> <math>p=0.69/&gt;0.05/=69%/&gt;5%</math> <b>OR</b> Movement away from flashing light is due to chance <b>as</b> <math>p=0.69/&gt;0.05/=69%/&gt;5%</math>;</p>	<p>3</p>	<p>2. and 3. Ignore '<b>results</b>' in the context of significance or chance</p>



### Question 8: Alevel 2019 Paper 3

<p>06.8</p>	<p><b>For</b></p> <p>1. Pain decreases more with Trexall/Group <b>R</b> compared with the control group/Group <b>S</b></p> <p><b>OR</b></p> <p>Pain decreases by 4.6 with Trexall/Group <b>R</b> and by 2 with the control group/Group <b>S</b>;</p> <p><b>Against</b></p> <p>2. Small sample size/only 12 people/only studied females / effects in males could be different;</p> <p>3. (Mean score for severity of) pain in control group/Group <b>S</b> is (also) lower;</p> <p>4. No statistical testing, <b>so</b> do not know if decrease/difference is significant;</p> <p>5. Pain is (a) subjective (measurement);</p>	<p>3 max</p>	<p><b>2 max for answer only giving reasons against</b></p> <p>1. Ignore numbers stated from <b>Table 3</b>, eg 9.7 to 5.1 <b>and</b> 9.8 to 7.8</p> <p>3. Could be subsumed within MP1</p> <p>4. Ignore 'do not know if <b>results</b> are significant'</p> <p>5. Accept 'patients might lie about pain'</p>
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### Question 9 AS 2019 Paper 1 Q9

<p>09.4</p>	<p><b>In support of suggestion</b></p> <p>1. Stops mitosis (at metaphase/anaphase)/cell division (so no tumour growth)</p> <p><b>OR</b></p> <p>Promotes apoptosis/programmed cell death (so tumour destroyed);</p> <p><b>Against suggestion</b></p> <p>2. Healthy cells (are) damaged/affected</p> <p><b>OR</b></p> <p>Causes side effects;</p> <p>3. Results from laboratory tests/tests on (isolated)</p>	<p>3 max</p>	<p>2 max for points "Against suggestion"</p>
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## Question 10 Alevel Paper 1 2020 Q9

<p><b>09.2</b></p>	<p>1. There is no association/correlation/relationship between the concentration of carbon dioxide and the stomatal density</p> <p>OR</p> <p>The concentration of carbon dioxide does not affect the stomatal density;</p> <p>2. Correlation coefficient;</p>	<p>2</p>	<p>1. Reject 'There is no difference between the carbon dioxide concentration and the stomatal density'.</p> <p>1. Do not credit 'The stomatal density does not affect the carbon dioxide concentration'.</p> <p>2. Accept 'Spearman's (rank)' or other named correlation coefficient.</p>
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<p><b>09.3</b></p>	<p>Final answer in range <math>2.\dot{6}</math> to <math>2.\dot{7}</math> ;;</p> <p>1 mark for</p> <p>Stomatal density decrease of 24 to 25</p> <p>OR</p> <p>Final answer of between <math>0.2\dot{6}</math> to <math>0.2\dot{7}</math></p> <p>OR</p> <p>Correct calculation with incorrectly rounding taking answer out of correct range</p>	<p>2</p>	<p>Accept any number of sf as long as rounding correct.</p> <p>Ignore minus signs.</p>
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<p><b>09.4</b></p>	<p>1. Increasing carbon dioxide (concentration) shows decreased stomatal <u>density</u>;</p> <p>2. Fewer stomata means less transpiration</p> <p>OR</p> <p>Fewer stomata means less evaporation (of water from leaves)</p> <p>OR</p> <p>Fewer stomata means less diffusion of water vapour (from leaves);</p> <p>3. Same (volume of) carbon dioxide can be absorbed for photosynthesis with smaller number of stomata;</p> <p>4. Don't know the size of the stomata;</p> <p>5. Don't know whether leaf size has changed;</p> <p>6. Don't know if this is true for all species (of plant);</p> <p>7. Don't know how long the stomata are open for;</p> <p>8. Don't know if this trend will continue (beyond the concentrations of carbon dioxide shown in Figure 10);</p> <p>9. Other factors affect transpiration (rate);</p>	<p>4 max</p>	<p>1. Accept 'There is a negative correlation between carbon dioxide (concentration) and stomatal <u>density</u>'.</p> <p>1. Accept 'stomata per <math>\text{mm}^2</math>' for 'stomatal density'.</p> <p>4, 5, 6, 7, 8. For 'don't know' accept idea that these things may/have change(d).</p> <p>6. Accept 'types' for 'species'.</p> <p>6. Accept 'more species (of plant) should be tested'</p> <p>9. Accept named factors that affect transpiration (rate).</p>
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### Question 11 A-Level Paper 2 2020 Q7

07.1	1.375 / 1.3746 / 1.38 / 1.4 (times greater);	1	
07.2	<p>1. Potassium nitrate most effective <b>and</b> chicken manure least effective;</p> <p>2. All fertilisers more effective than control;</p> <p>3. No increase (in growth) with potassium nitrate above 30g;</p> <p>4. Ammonium sulfate (shows) small/gradual increase after 30g;</p> <p>5. Chicken manure effectiveness decreases after 45g</p> <p>OR</p> <p>Chicken manure effectiveness decreases at 60g;</p> <p>6 Fertiliser/s provide nitrogen source for protein;</p> <p>7. No statistical test (to determine if differences are significant);</p> <p>8. Only shows (results for) spinach;</p>	5 max	<p>1. Accept greatest/highest growth/mass for most effective, and lowest growth/mass for least effective.</p> <p>7. Accept 'no SDs' (to determine if differences are significant).</p> <p>7. Accept no (named) stats test, no error bars and no confidence limits.</p> <p>8. Accept only shows 'one species' or one type of plant.</p>

### Question 12: Alevel Paper 2 2020 Q8

08.3	<p>1. Effective as D has lower protein (than B/C);</p> <p>2. Not fully effective as D has higher protein than A;</p> <p>3. Do not know all results for other mice in D</p> <p>OR</p> <p>Only shows results for 68% of mice;</p> <p>4. Some of D mice may have been cured</p> <p>OR</p> <p>Some of D may have died;</p> <p>5. Do not know actual/numerical quantity of protein;</p> <p>6. (Investigation) only on mice</p> <p>OR</p> <p>(Investigation) not on humans;</p> <p>7. Rejection may occur;</p> <p>8. Only shows results for 20 weeks/short-time period</p> <p>OR</p> <p>Long-term effects not known;</p>	4 max	<p>Accept descriptions of each group e.g. A = wild type mice. B = AS mice. C = AS mice that received AS stem cells. D = mice that received wild type stem cells.</p> <p>Accept 'healthy' or 'without AS' for 'wild type'.</p> <p>6. Accept 'rats' for 'mice'.</p> <p>7. Accept 'immune response' for rejection.</p> <p>Ignore answers relating to sample size or statistical test.</p>
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**Question 13: AS Paper 1 2020 Q5**

<p><b>05.4</b></p>	<p><b>In support</b></p> <ol style="list-style-type: none"> <li>(Link/risk with asthma and) living with cat or dog is (statistically) significant;</li> <li>(Link with) obesity is most/highly significant;</li> </ol> <p><b>Not supported</b></p> <ol style="list-style-type: none"> <li>(Link/risk with asthma and) burned wood (indoors) is not (statistically) significant;</li> </ol>	<p>3</p>	<p>Reject 'results are significant'</p> <p>Accept 'due to chance' for 'not significant' and converse</p>
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**Question 14 Alevel Paper 3 2021 Q2.2**

<p><b>02.2</b></p>	<p><u>For</u></p> <ol style="list-style-type: none"> <li>(There appears to be) no virus/ HIV(-1)/RNA/DNA, so could be a cure/effective;</li> <li>No CCR5/receptor, so not get HIV(-1) in the future</li> </ol> <p><b>OR</b></p> <p>No CCR5/receptor, so nothing for HIV(-1) to bind to;</p> <ol style="list-style-type: none"> <li>Only one transplant/BSCT needed (shown by patient <b>Q</b>)</li> <li>Would not need (daily) ART (16 months after BSCT);</li> </ol> <p><u>Against</u></p> <ol style="list-style-type: none"> <li>Don't know if chemotherapy/radiotherapy is needed</li> </ol> <p><b>OR</b></p> <p>Do not know if BSCT alone would be effective;</p> <p><b>OR</b></p> <p>Do not know which treatment is having the effect</p> <p><b>OR</b></p> <p>Could be due to chemotherapy/radiotherapy;</p> <ol style="list-style-type: none"> <li>Only for HIV-1;</li> <li>Don't know if it would work in all people</li> </ol> <p><b>OR</b></p> <p>Only worked/tried in 2 cases;</p> <ol style="list-style-type: none"> <li>Might not be long term</li> </ol> <p><b>OR</b></p> <p>Only 18 months;</p> <ol style="list-style-type: none"> <li>HIV-1 may mutate and be able to bind to a different receptor (on T<sub>H</sub> cells);</li> <li>Might be a lack of (suitable stem cell/BSCT) donors;</li> </ol>	<p>5 max</p>	<p>Max 4 for reasons for or against</p> <ol style="list-style-type: none"> <li>Ignore virus is killed</li> <li>Reject less CCR5/less HIV(-1) bind</li> </ol> <p>5. Accept: chemotherapy/radiotherapy is toxic/harmful/has side-effects</p> <p>6. Accept: Might not work in other types of HIV</p> <p>10. Accept stem cells/BSCT (might be) rejected</p>
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