



**General Certificate of Education (A-level)**  
**June 2013**

**Human Biology**

**HBI6X**

**(Specification 2405)**

**Unit 6X: Externally Marked Practical  
Assignment**

**Final**

***Mark Scheme***

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**HBI6X: Task 1**

Question	Marking guidance	Mark	Comment
1 (a)	1. To show that any change is due to the antiseptic not to adding more liquid; 2. Can compare tubes to show the effect of the antiseptic;	1 max	
1 (b)	1. The gas is only/all carbon dioxide; 2. Gas is all from products of respiration; 3. Tubes are the same diameter;	2 max	Allow ref to carbon dioxide dissolving Allow similar numbers of yeast cells in each tube
2	1. Fewer yeast cells inside small tube so less respiration/diminished rate of gas production/smaller bubble; 2. Level of liquid inside small tube may be covered up by level of liquid displaced outside it/displaced yeast suspension obscures bubble;	2	
3	1. Depends on volume of carbon dioxide produced/CO <sub>2</sub> produced in respiration; 2. In set time/10 minutes;	2	Look for volume not amount Principle-rate=volume per unit time
4 (a)	1. Some of the carbon dioxide dissolves/reacts; 2. Produces Carbonic acid; 3. Produces H <sup>+</sup> ions;	2 max	Ignore anaerobic respiration produces lactate/lactic acid Do not allow hydrogen alone
4 (b)	Add a buffer;	1	
<b>Task 1 Total</b>		<b>10</b>	

**HBI6X: Task 2**

Question	Marking guidance	Mark	Comment
5	<ol style="list-style-type: none"> <li>1. Data presented clearly with full descriptions of both the independent variable (antiseptic concentration) and dependent variable (length of bubble);</li> <li>2. Antiseptic concentration in first column or across the top of columns for concentrations;</li> <li>3. Units clearly stated (% and mm) and only in the headings to appropriate columns;</li> <li>4. Data show correct trend (increasing antiseptic concentration decreasing volume of gas/length of bubble);</li> </ol>	4	<ol style="list-style-type: none"> <li>2. Antiseptic concentration in first row if table horizontal</li> <li>3. Accept <math>\text{cm min}^{-1}/\text{mm min}^{-1}</math></li> </ol>
6 (a)	Antiseptic concentration has no effect on rate of respiration in yeast/no effect on length of bubbles produced;	1	
6 (b)	Spearman's (rank correlation);	1	
6 (c)	Valid explanation for choice of statistical test (looking to see if there is a correlation between two variables);	1	
6 (d)	Test statistic calculated accurately;	1	Allow correct calculation of chosen test (even if wrong test used)
6 (e)	<ol style="list-style-type: none"> <li>1. Correct interpretation of statistical test in terms of acceptance or rejection of null hypothesis;</li> <li>2. Interpretation involves appropriate reference to/probability of results occurring by chance;</li> </ol>	2	1. Allow correct explanation of chosen test
<b>Task 2 Total</b>		<b>10</b>	

**HBI6X: Written Test Section A**

Question	Marking Guidance	Mark	Comment
7	More accurate measurements;	1	Accept precise/nearer true value
8	<ol style="list-style-type: none"> <li>1. Damage/irritation to skin <u>cells</u>/affects skin flora;</li> <li>2. Cost effective;</li> <li>3. Lower concentration may still be effective;</li> <li>4. Different antiseptics may be used in skin cleansers;</li> </ol>	2 max	Reject 'good' bacteria
9	<ol style="list-style-type: none"> <li>1. Ionic/H bonds broken;</li> <li>2. Enzyme/Active site shape altered;</li> <li>3. Fewer ES complexes/substrate won't fit;</li> <li>4. Rate of respiration slows down;</li> </ol>	3 max	Reject – unqualified bonds – disulphide/covalent bonds
10 (a)	There is no difference between the effect of the two antiseptics on the rate of respiration;	1	
10 (b)	<ol style="list-style-type: none"> <li>1. Standard error (and 95% confidence limits)/student t-test;</li> <li>2. Comparing the mean results/comparing two means;</li> </ol>	2	
11	<ol style="list-style-type: none"> <li>1. Add methylene blue to yeast with antiseptic and to yeast on its own/with distilled water;</li> <li>2. (Use a microscope) to see if there are more blue cells with antiseptic/concept of comparison of blue cell count;</li> </ol>	2	
12 (a)	Population does not increase/gets smaller;	1	

12 (b)	<ol style="list-style-type: none"> <li>1. Named substance or ion moves in/out more;</li> <li>2. Consequence of (that) movement;</li> </ol>	2	
<b>Section A Total</b>		<b>14</b>	

**HBI6X: Written Test Section B**

Question	Marking Guidance	Mark	Comment
13	<i>Propionibacterium acnes</i> ;	1	No mark for <i>P.acnes</i>
14	<p>Yes (no mark)</p> <ol style="list-style-type: none"> <li>Spots do get smaller and less red;</li> <li>Data from table do support smaller/less red spots eg 34 out of 45 volunteers reported smaller spots after 24 hours;</li> </ol> <p>No (no mark)</p> <ol style="list-style-type: none"> <li>Results are subjective/not effective in all cases;</li> <li>Data to support MP3;</li> <li>Small sample size/only carried out on men;</li> <li>No stats test carried out;</li> </ol>	2 max	Can get two marks for only giving “Yes” reasons or “No” reasons
15 (a)	C (no mark). Numbers fall more steeply/biggest fall in numbers;	1	
15 (b)	<ol style="list-style-type: none"> <li>Removal of skin cells also removes the bacteria on them;</li> <li>Less chance for a resistant population to develop/less chance of a mutation arising;</li> </ol>	1 max	
16	28 to 28.2;	2	1 mark for 3.5/12.4 or 3500/12400
17	<ol style="list-style-type: none"> <li>Resistant bacteria still present at week 4;</li> <li>No data beyond week 4;</li> <li>All bacterial numbers have fallen;</li> </ol>	2 max	3. Must refer to resistance to both antibiotics
18	<ol style="list-style-type: none"> <li>People with other skin diseases/people with named skin diseases/burns victims/open wounds;</li> <li>Side effects/peeling skin/irritation could make disease/burns worse;</li> </ol>	2	2. Marking point needs to link side effects to worsening of condition

19	<p>FOR:</p> <ol style="list-style-type: none"> <li>1. Benzoyl peroxide reduces number of resistant bacteria/increases probability that antibiotics will work;</li> <li>2. Less benzoyl peroxide could mean less skin damage;</li> <li>3. Each works on its own;</li> </ol> <p>AGAINST:</p> <ol style="list-style-type: none"> <li>4. Small sample size/no stats test/sample not representative;</li> <li>5. Phycosaccharides as an effective alternative;</li> <li>6. Benzoyl peroxide is not suitable for people with other skin diseases/dry skin/phycosaccharides might have fewer side effects;</li> <li>7. None of the treatments is 100% effective;</li> <li>8. Do not know what would happen if time scale were to be extended/after 4 weeks 24 hours/correct time reference;</li> </ol>	5 max	Max 4 if all against
<b>Section B Total</b>		<b>16</b>	