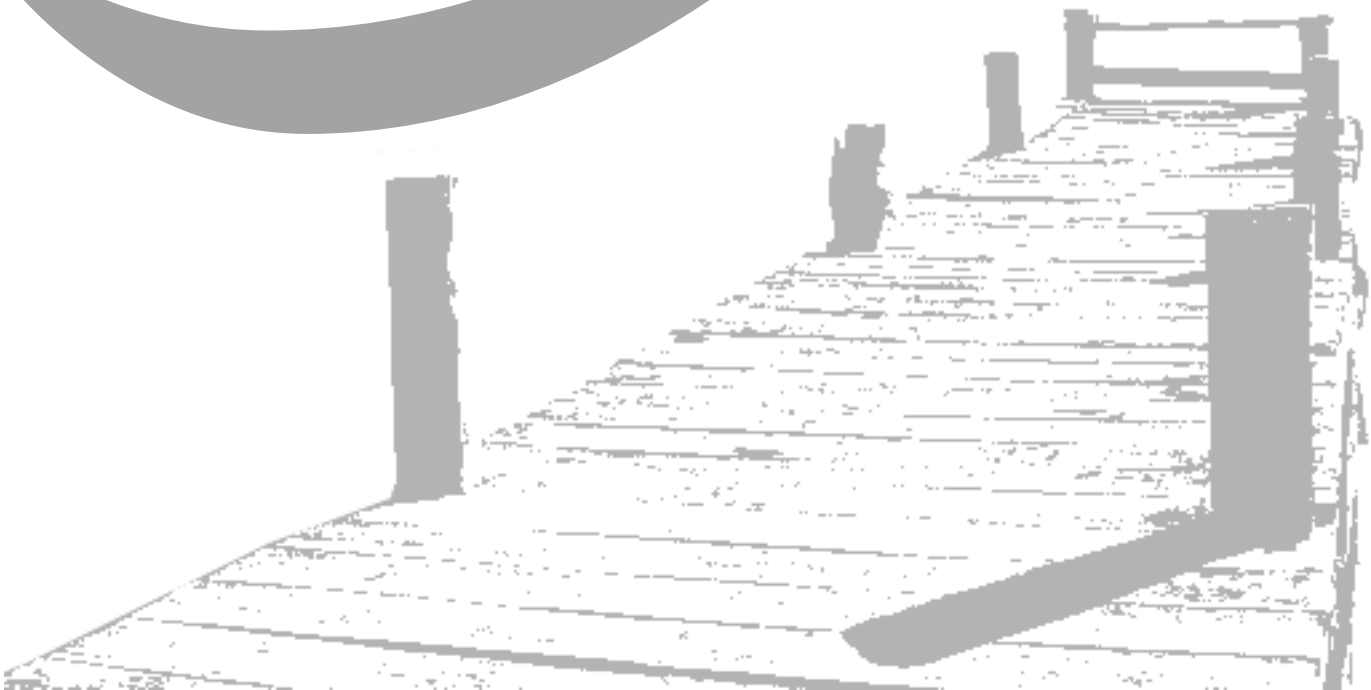
GCE
AS and A Level

Human Biology

AS exams 2009 onwards
A2 exams 2010 onwards

Unit 6T:
Specimen mark scheme

Version 1.1



Version 1.1: 0108

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Human Biology 2405

Investigative Skills Assignment (ISA)

HBI6T A2 Centre Assessed Unit

Mark Scheme

Specimen Paper

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Assessment of presentation of raw data

Candidates should be assessed on their ability to present raw data in an appropriate way. The following criteria should be used to mark this skill.

Title given which relates the independent and dependent variables. 1

Column headings correctly identify both the independent and dependent variables with independent variable in first column. 1

Units clearly stated, and only in the heading of the appropriate row or column. 1

Total 3

Teachers are referred to the Institute of Biology publication, *Biological Nomenclature, 3rd edition, 2000.*

The table of raw data collected during implementation will be required at moderation and should be attached to the ISA test.

Assessment of use of statistical test

Candidates should be assessed on their ability to use a statistical test according to the following mark scheme (**one mark** for each).

1. Null hypothesis clearly stated. 1

2. Choice of statistical test appropriate. 1

3. Valid reason for stated choice of statistical test. 1

Total 3

The statements and statistical test calculations will be required at moderation and should be attached to the ISA test.

SECTION A

Question 1

Denaturation of (bacterial) enzymes at high temperature;
Rapid multiplication of pathogens (circa. body temperature);
Little / no growth at low temperature 2 max

Question 2

(a) Agar plate with no bacteria; 1

(b) To demonstrate IV (alone) responsible for effect; 1

Question 3

Two from:
Volume of disinfectant/soaking time/size of disc/volume of agar/'size' of bacterial inoculation/incubation time;; 2

Question 4

DV related to IV (in relation to trend or patterns);
Appropriate use of data; 2

Question 5

(a) Named test appropriate to data with appropriate justification for named test; 1

(b) IV will have no effect on DV/eq.; 1

(c) (no mark for transcribed value from calculations)
Use of critical value / probability level and df;
Value to left or right / eq;
OR
Mean + SE range;
Overlapping ranges or not; 2

(d) Null hypothesis accepted / rejected (as appropriate);
Differences not significant / significant;
Differences due to chance / not due to chance; 2 max

Question 6

Values quoted appropriate (from data) to support assertion;
Explanation adequate e.g. an outlier / all values similar etc; 2

Total 16

SECTION B

Question 7

(Approximately) 1000 deaths annually;
Slightly greater risk in 2004 (1168 deaths);
More risk of developing non-MRSA infection;
But low chance (9%) of becoming infected at all; 3 max

Question 8

(a) 4.0; 1

(b) Z more effective / eq;
Least growth next to antibiotic / zone of inhibition the greatest;
Both reduce growth / eq;
Both have similar effect since difference in measurements is small / eq; 2 max

(c) Definition of range + compared for **Y** and **Z**;
Range is the same for **Y** and **Z**;
Suggests variation in measurements is similar;
Definition of SD + **Z** higher;
Effect of **Y** is more uniform; 4

(d) Strain used (of bacterium) not resistant to antibiotics;
Soaked discs contained high doses of antibiotic;
Methicillin was not one of the antibiotics tested; 2 max

Question 9

(a) Results only available from 2 complete years;
Possible reduction in 2005 but not based on full year results; 2

(b) Full year results for 2005/6 would suggest cases remain above 7000;
2007/8 projection would still be above target; 2

Question 10

Dilutions given;
(Nutrient) agar sterilised;
Flame neck of flask before pouring agar;
Use of sterile Petri plates;
Use sterile water for dilutions;
Mix dilution before serial dilution from it;
Use of sterile glassware/pipettes/tubes;
Flame loop/spreader/use of alcohol;
Multiply number of colonies by dilution;
Replicates; 6 max

Total 22