

## APPENDIX 1:

### University regulations governing the examinations for Part IA of the NST

15. The subjects of examination in Part IA, which shall be divided into two groups, A and B, shall be as follows:

#### Group A

Biology of Cells	Evolution and Behaviour
Chemistry	Materials Science
Computer Science	Physics
Earth Sciences	Physiology of Organisms

#### Group B

Mathematics	Mathematical Biology
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16. Each candidate shall offer three subjects from Group A and one subject from Group B providing that no candidate shall offer both Biology of Cells & Computer Science. A candidate taking the examination under the provisions of Regulation 2(b) shall not offer Biology of Cells, Evolution and Behaviour, or Physiology of Organisms, if he or she has previously obtained honours in the Medical and Veterinary Sciences Tripos.

17. (a) There shall be separate examinations set for each subject, as specified below:

(i) one written paper of three hours:

Chemistry	Materials Science
Computer Science	Physics
Evolution and Behaviour	Mathematical Biology

(ii) two written papers of three hours:

Mathematics

(iii) one written paper of three hours and a practical examination:

Biology of Cells	Physiology of Organisms
Earth Sciences	

The practical examination (where such exists) may include a *viva voce* examination.

(b) In addition to the written and practical examinations, for all subjects except Biology of Cells and Physiology of Organisms, candidates shall be required to submit records of practical work and/or fieldwork for each subject. Such records shall be presented for inspection on the request of the Examiners as follows: in Computer Science, on a date or dates announced by the Head of the Computer Laboratory no later than the division of Michaelmas Term; in Materials Science, on a date or dates announced by the Head of the Department of Materials Science and Metallurgy not later than the beginning of the Michaelmas Term; in Mathematics, on a date or dates to be announced by the Examiners not later than the beginning of the Michaelmas Term; in other subjects, on the day after the last written examination in that subject. The records shall bear the signatures of the teachers under whose direction the work was performed.

(c) In assigning marks for the examination in Earth Sciences, the Examiners may, at their discretion, take account of the note-books submitted by candidates. In assigning marks for the examination in all other subjects, except Biology of Cells and Physiology of Organisms, the Examiners shall take account of the records of practical work and/or fieldwork submitted by candidates. Assessment shall be undertaken by the Examiners or, for the following subjects, be provided to the Examiners from the following persons:

**Subject**

Chemistry  
Computer Science  
Materials Science  
Physics

**Provider of assessment**

Head of the Department of Chemistry  
Head of the Faculty of Computer Science  
Head of the Department of Materials Science  
Head of the Department of Physics

## APPENDIX 2:

### Marking guidelines for examinations in the Natural Sciences Tripos

#### Part IA

Examiners are nominated by the various Faculties and Departments who contribute to teaching in the Tripos and are formally appointed by the General Board. In each subject, there is a Senior Examiner and other appointed Examiners and Assessors who are responsible for setting the papers and marking the scripts. There is also a Chairman of Examiners who, along with the Senior Examiners, assigns classes to candidates and produces the class list and final markbooks.

#### *Marks from individual subjects*

In each subject, the Examiners produce a mark out of 100 for each candidate.

For many subjects, the final mark will consist of a component from written papers and a component from continually assessed work or written practical examination. The marks for these two components are also submitted separately; they should add up to the total mark and it should be made clear how marks out of 100 are allocated to each component.

**Marks are norm-referenced between candidates sitting that subject.** The ranked candidate list is partitioned into three sections and the marks are scaled such that:

25% of candidates achieve a mark of 70.0-100.0

65% of candidates achieve a mark of 50.0-69.9

10% of candidates achieve a mark of 0-49.9

A “fail” is normally thought of as 40.0 marks and below; note, however, that in Part IA of the NST a failure in a single subject is of no particular consequence other than the low mark.

The Committee for Management of NST have agreed that the target distribution (percentages) should include only NST candidates. Candidates for other triposes borrowing the NST examinations should have their marks scaled in the same manner as those taking NST, but their numbers should not be taken into account when setting the subject class boundaries.

Experience indicates that large subjects (those with, say, more than 150 candidates) should have no difficulty reaching these targets to within a few percent. Smaller subjects are not expected to hit these targets so closely.

Examiners should use their discretion over the 10% target for the bottom section of the ranking. Experience is that the numbers who can reasonably be placed in this band do tend to vary very much from year to year, even in large subjects.

If a Senior Examiner feels that there are compelling reasons to deviate from these targets he or she must discuss this with the Chairman of Examiners well in advance of the final meeting.

#### *Submitting marks*

The final (aggregate) mark will be shown rounded to one decimal place in the final markbook, but as there may be intermediate stages of manipulation it is required that marks from individual subjects be submitted **without any rounding**.

#### *Classing procedure*

In the overall spreadsheet that combines the marks for all the different subjects a percentage ranking for each candidate in each of their subjects is calculated (with 100% corresponding to the top mark and 1% the bottom mark). The four percentage rankings for each candidate are summed (with a weighting of 0.75 for Maths and

Math. Biol.) and divided by 3.75 to produce a mean percentage ranking for the Tripos (out of 100). The mean percentage ranking is then used by the Senior Examiners to determine an order-of-merit for the field of candidates, who are then assigned classes for the Tripos such that:

- 25% of candidates for the Tripos achieve a 1st class
- 67.5% of candidates for the Tripos achieve a 2nd class
- 7.5% of candidates for the Tripos achieve a 3rd class or fail.

The order-of-merit compiled by the Examiners is used as a tool to aid them in determining the overall performance of candidates. It is not meant as a firm indicator of any individual candidate's relative standing in the field. Small deviations from these percentages may be justified (especially in the 3<sup>rd</sup> class, and fail categories) depending on the field of candidates.

Candidates who achieve 149 or less marks out of the maximum 375 will not necessarily be awarded honours, although this will be a decision of the Examiners.

The final boundary mean percentage rankings and boundary marks (for the 3<sup>rd</sup>/Fail borderline) used and the number of candidates in each class are included in the final markbook which is sent to Colleges.

**APPENDIX 3:****NATURAL SCIENCES TRIPOS  
EXAMINATIONS DATA RETENTION POLICY****Part IA**

The following data are retained by Colleges and the Educational and Student Policy section of the University:

<b>Routinely available data:</b>		
<b>Data</b>	<b>Retention period</b>	<b>Accessible through:</b>
Final Mark Book	Indefinitely	College DoS or Tutor NST Committee Secretary

The marks contained in the final mark book include a mark for each subject taken and the overall class. Further information is contained in the markbooks distributed to colleges which include ALL information that the Examiners have determined as being meaningful or helpful as indicators of examination performance.

**Other information that is not included in the mark book is considered to be relatively meaningless as an indication of examination performance, given the moderation processes that are used in determining a class by Examiners.**

Where any automated compiling or processing of marks is used, the results are subsequently deliberated by the Board of Examiners responsible.

Please request data in writing from:

<b>NST Secretary</b>	<b>Chairman of Examiners (Part IA)</b>
Jane Clare Educational & Student Policy Academic Division 17 Mill Lane Cambridge CB2 1RX	Dr Dee Scadden Dept of Biochemistry Building O, Downing Site Cambridge CB2 1QW

NATURAL SCIENCES TRIPOS

ADVICE REGARDING WRITING ON SCRIPTS

The Committee of Management for the Natural Sciences Tripos has agreed to endorse the General Board's advice on the writing on examination scripts. The advice from the General Board's Education Committee is based on two principles: objectivity of marking (where double marking is used) and the administrative complications of retaining and disseminating comments on scripts to students if requested to do so.

**Where this is not already current practice, Examiners are recommended to record their marks and comments separately from the examination scripts. Such marks and comments should be recorded clearly in a way that will aid reference to the original work.**

**In all cases, Examiners and Assessors should ensure that some indication (i.e. a tick or other identifier) is made on each page of the script to indicate that it has been read and reviewed.**

**The Committee of Management for the NST has agreed that there are cases where it is sensible and prudent for marks and comments to be made on the scripts; in these instances, Examiners should take due care that this data can be retrieved easily if a request is made.**

Examiners are entitled to make comments on scripts, providing that they are aware that students may request a transcription of those comments. It is the responsibility of the Examiners, or the relevant Department, to ensure that there are resources and procedures in place to deal with any such requests as they arise.

## APPENDIX 5:

### Piecewise linear scaling and marks for the final markbook

The marks for each subject are scaled using a norm-referencing process prior to them being aggregated into the overall NST mark. This process aims to ensure both a consistency between subjects and between years. There are two steps involved in the scaling of the subject marks: (a) the candidates are partitioned into three sections determined by their ranking and the target distribution, and (b) applying a piecewise linear scaling of the raw marks.

**Only candidates who have sat ALL parts of the examination in your subject should be included in this process.** Candidates who have withdrawn from all or part of the examination should be **EXCLUDED**. (In the markbook, the letter “W” should be placed in the column(s) for the missed component(s) but the “Total” column should indicate the total marks obtained in the parts of the examination, written papers or coursework, that were attended).

#### **(a) Determining the section boundaries**

The Committee for the Management of NST have agreed that for the purposes of determining the target subject mark distribution (see Appendix 2), only NST candidates should be included. The procedure for determining these boundaries is as follows:

1. Determine an overall subject mark for all candidates who have completed the subject examination;
2. Extract a list of the subset of candidates who are taking NST;
3. Order the NST candidates in decreasing order-of-merit;
4. **As a first approximation**, partition the NST candidates into three sections, the top 25% (TOP), the next 65% (MIDDLE) and the bottom 10% (BOTTOM). These classifications are used by some Colleges to give candidates an indication of their nominal class (First, Undivided Second or Third/Fail) in that paper.
5. Scrutinise the candidates (both NST and those from other triposes) near the boundaries of these sections and, where they have equal (or very similar) marks, move the boundary up or down until you are satisfied that there is an appropriate division.

#### **(b) Piecewise linear scaling of the total mark**

Having established the boundary marks (as described in (a) above), a piecewise linear scaling is to be applied to all candidates who completed the examination (**including** those from other triposes who have been excluded from the process of determining the boundary marks).

Piecewise-linearly scale the marks as follows:

<b>Section</b>	<b>Raw Totals</b>	<b>Scaled Totals</b>
TOP	$max$ to $a$	100 to 70
MIDDLE	$a$ to $b$	70 to 50
BOTTOM	$b$ to 0	50 to 0

where  $max$  is the maximum possible number of raw marks attainable for the subject  
 $a$  is the raw total of the lowest candidate in the TOP section  
 $b$  is the raw total of the lowest candidate in the MIDDLE section

Note: the lowest mark possible is zero and  $max$  is the maximum potential marks available in the subject, not the score of the highest ranking candidate.

For the TOP section, for the normalised total (*Norm*), apply the following formula to the raw total (*Raw*):

$$Norm = \frac{30 \times (Raw - a)}{max - a} + 70$$

In Excel, that would be a formula of  $\text{="(30*("cellref"-a)/(max-a))+70"}$

For the MIDDLE section, for the normalised total (*Norm*), apply the following formula to the raw total (*Raw*):

$$Norm = \frac{20 \times (Raw - b)}{a - b} + 50$$

In Excel, that would be a formula of  $\text{="(20*("cellref"-b)/(a-b))+50"}$

For the BOTTOM section, for the normalised total (*Norm*), apply the following formula to the raw total (*Raw*):

$$Norm = \frac{50 \times Raw}{b}$$

In Excel, that would be a formula of  $\text{="50*"cellref"/b"}$

Alternatively, you can use a single Excel formula for all candidates:

$$\text{IF("cellref">=a, (30*("cellref"-a)/(max-a))+70, IF ("cellref">=b, (20*("cellref"-b)/(a-b))+50, 50*"cellref"/b))}$$

### **(c) Scaling of the component marks**

Having normalised the total marks (as described in (b) above), the component marks (written paper and practical marks) will also have to be scaled so that they add up to the normalised total. The preferred way to do this is to scale each raw component mark by the same factor as the raw total was scaled. Thus, each normalised component mark (*NormComp*) would be obtained from the corresponding raw component mark (*RawComp*) using the following formula:

$$NormComp = \frac{RawComp \times NormTotal}{RawTotal}$$

An alternative method would be to keep the practical component unchanged and calculate the normalised written paper mark by

$$NormWritten = NormTotal - Practical$$

However this is not preferred as it means that the written paper mark is scaled by a bigger factor and this might give the candidate the wrong impression about his/her ability in the subject.

## APPENDIX 6:

### USEFUL CONTACTS

**Chairman of Examiners, Part IA**

Dr Dee Scadden  
Dept of Biochemistry  
Building O, Downing Site  
Cambridge CB2 1QW

Email: [adjs100@cam.ac.uk](mailto:adjs100@cam.ac.uk)

tel: 33671

**Secretary, Committee of Management for the NST**

Jane Clare  
Educational and Student Policy  
Academic Division  
17 Mill Lane  
Cambridge CB2 1RX

Email: [Jane.Clare@admin.cam.ac.uk](mailto:Jane.Clare@admin.cam.ac.uk)

tel: 64853

**Student Registry**

4 Mill Lane, Cambridge, CB2 1RZ      General number (7)66302

Head of Records and Examinations:

Jenny Green

email: [Jenny.Green@admin.cam.ac.uk](mailto:Jenny.Green@admin.cam.ac.uk)

Exams Office

tel: (7)64995 or (3)34488

**Secretary, Board of Examinations**

Mrs Catherine Fage

Email: [catherine.fage@admin.cam.ac.uk](mailto:catherine.fage@admin.cam.ac.uk)

tel: 32303

**Psychological & Behavioural Sciences Tripos**

Ms Jo Simmonds  
Department of Psychology, Free School Lane

email: [jms311@cam.ac.uk](mailto:jms311@cam.ac.uk)

tel: 68218

**Reprographics Centre**

The Old Schools

Mr Nigel Reynolds

Email: [nigel.reynolds@admin.cam.ac.uk](mailto:nigel.reynolds@admin.cam.ac.uk)

tel: 48721

**APPENDIX 7:**

**Material to be submitted for the final Senior Examiners' meeting**

**PLEASE FILL IN THIS SHEET AND BRING THIS TO**

The Secretary to the Committee of Management for the NST  
 Educational & Student Policy, Academic Division  
 17 Mill Lane  
 Cambridge CB2 1RX

**ALONG WITH**

- a copy of the marksheet, signed by all Examiners
- an electronic copy of the marksheet, in the correct format, on a USB stick

**SUBJECT** .....

**Percentage of candidates in each partition of normalised mark**

<i>partition</i>	<i>All candidates</i>		<i>NST candidates</i>		<i>target %</i>
	<i>number</i>	<i>percentage</i>	<i>number</i>	<i>percentage</i>	
TOP					<b>25</b>
MIDDLE					<b>65</b>
BOTTOM					<b>10</b>
<b>TOTAL</b>					<b>100</b>
withdrawn		-		-	-

*Withdrawn candidates should be excluded from the total*

Have you deviated from the target class percentages? .....

**The boundaries of the partitions in terms of raw marks**

- i.e.*
- max* : the maximum number of marks allocated to the subject
  - a* : the raw mark of the lowest candidate in the TOP section
  - b* : the raw mark of the lowest candidate in the MIDDLE section

<i>boundary</i>	<i>raw mark</i>	<i>scaled mark</i>
<i>max</i>		<b>100</b>
<i>a</i>		<b>70</b>
<i>b</i>		<b>50</b>