

NATURAL SCIENCES TRIPOS

SENIOR EXAMINER'S REPORT

SUBJECT: NST 1A Physiology of Organisms

Senior Examiner:

Examiners:

Structure of the examination:

Written paper/s: PHO/WP (written practical, 1.5 hour exam: 30 MCQs based on practical material)
PHO/1 (written paper, 3 hour exam: 10 SAQs based on theory, plus 2 essays)

Practical components: None except written practical paper, as above.

Number of candidates: 194, of which 192 submitted papers. Two presumably withdrew.

Conduct of the Examination:

- *any incidents that occurred during the examinations and summary of how they were dealt with,*

We were not told of any problems that occurred during the examinations themselves, and were not informed of any late scripts. Data on when students uploaded their papers were collected by the Senior Examiner, and it seemed clear that many or even most students were not uploading their scripts as soon as the exam had formally ended. Many uploaded late into the 30+10 minute upload window, leading the Examiners to suspect that some had used some of this time to complete their answers. No action could be taken, however.

All essays were put through Turnitin. Following the process outlined by the SBS, we identified 8 scripts which contained concerning levels of plagiarism. Following discussion between the Senior Examiner and the Chair of Exams, it was decided that no action needed to be taken for 6 of these 8 scripts because only isolated, individual sentences had been copied, from multiple sources. Two scripts, however, proved to have long sections directly copied from a single, local source. The Chair of Exams organised meetings with the students concerned, their Directors of Studies, the Senior Examiner and Jane Clare. It was established that substantial amounts of material (around 50% of the essays) had been cut and pasted from supervision essays, although the Senior Examiner had made it clear to all students that this was prohibited. The Chair's decision was to impose a sliding scale to penalise those essays, by reducing marks proportional to the amount copied. The Senior Examiner implemented this process.

- *was the timetabling of the examinations appropriate*

Yes, we had no difficulties with this.

- *where candidates have a choice of question, please give the number of candidates answering each question.*

There was a choice element in the two essays within PHO/1, where students had to choose two essays from a choice of six. The numbers answering each were:

1a	52
2	54
3	82
4	11
5	155
6	29

Question 5 was the most similar to essays that had been set before. Marking of Question 5 was divided between two Examiners, who produced a common mark-scheme; a small number were second-marked by the other Examiner for comparison purposes. The Senior Examiner later applied a marks addition to bring the means from these two Examiners into line.

Marking/Scaling:

- *the arrangements for marking and classing with reference to agreed criteria, noting any divergence and the reasons; please include the percentage in each class, the average mark and standard deviation,*

Examiners were given the marking criteria issued on the Faculty website, prior to marking their essays. The marks from two Examiners for the essays (50% of total) were adjusted by the Senior Examiner to bring means into line. The short-answer questions (25% of total) were marked based on objective mark-schemes decided by the Examiners for each question in advance; the practical MCQs (25% of total) were automatically marked using a spreadsheet.

We achieved the following raw marks distribution, prior to scaling.

Class	Number of students (/192)	Percentage of students
1	25	13.0
2.1	95	49.5
2.2	55	28.7
3	14	7.3
Fail	3	1.6

The overall mean mark before scaling was 61.9%, SD 8.07%.

We then applied the scaling algorithm provided by the Faculty and achieved the following distribution:

Class	Number of students (/192)	Percentage of students
1	48	25.0
2.1	73	38.0
2.2	53	27.6
3	15	7.8
Fail	3	1.6

After the scaling algorithm provided by the Faculty, the mean was 62.7%, SD 9.33%. The main change that the algorithm produced was to stretch the top end such that more students moved from the 2.1 category into the first-class category. The overall distribution fits the Faculty recommendation that 25% of students achieve firsts, 65% seconds (undivided) and 10% thirds and below.

- *Comments (if relevant) on variation of performance between papers.*

The reason that 25% of students did not reach the first-class category prior to this manipulation was that their scores in the essays (mean 60.5%) and in particular the theory SAQ section (mean 52.1%) were too weak. The mean mark for the practical MCQ section (74.4%) was stronger.

The reasons for the poor performance in the theory SAQs were unclear. The Examiners felt that each question was straightforward, and marks schemes had been devised such that a student could gain full marks based on material found in the lecture notes – and it was an open-book exam. The Examiners found that some students ignored components of the questions, misinterpreted elements of the question or produced overly trivial answers. However, it was felt that poor exam technique may have contributed to the low marks. MCQs had previously been used in the theory section of this exam, and although examples of the new SAQ type had been provided and the SAQs were modelled on the SAQ papers used in M&VST resit exams in terms of difficulty, length and timing, it may have been that some students struggled to find the right pace for the new type of question.

The essays that we received were very variable in quality. As usual, most essays contained detailed and generally accurate replications of the lecture material, the better students being able to knit these details together into a coherent argument that fully answered the question. We were pleased to note that more students than usual had been able to incorporate information from outside the lecture course in their answers, sometimes including information from research papers. We did also receive a disappointing number of very short or very superficial answers, however.

The main concern of the students prior to the examination had actually been the practical paper, which had moved from SAQ to MCQ format this year. Having received feedback that students wanted more examples of practical MCQs, these had been provided by the Senior Examiner. The mean mark for this paper was actually much higher than for the other two components of the exam.

Subject Examiners' Meeting:

- *attendance and any dispensations for absences,*

All Examiners attended the meeting on 29.6.21. The two Assessors did not attend, but the Senior Examiner had met with them previously to discuss their thoughts. All meetings were conducted via Zoom.

- *any discussion of marginal candidates.*

There was no discussion of marginal candidates.

Administration:

The examination papers were uploaded by the Senior Examiner to the university portal in good time. The technical staff from PDN, led by [REDACTED], later distributed the essay scripts to the Examiners who would be marking them. [REDACTED] also ran the Turnitin process, passing the reports to [REDACTED] and [REDACTED] for scrutiny. [REDACTED] wrote reports for the Senior Examiner, who informed the Chair of Exams about the conclusions.

Conclusions and Recommendations:

- *any recommendations relating to any representations concerning the conduct of the examination to be taken to the Final Senior Examiners meeting,*

We have received no representations to date.

- *Any suggestions for changes to procedure for future Subject Examiners,*

This year we moved from practical SAQs and theory MCQs, to theory SAQs and practical MCQs. This was already permitted within the Form & Conduct for this examination. The new approach was chosen because it was felt that for an open-book exam, this would reduce the marks that could be obtained simply by looking up details.

Following discussion at the Examiners' Meeting, the Examiners agreed that although mean marks were low for the theory SAQ paper, and it might require additional assessor support for marking purposes, they preferred the theory SAQ format to the MCQ component that it replaced. The SAQs were easier to set and they assessed a deeper level of understanding than MCQs. The Examiners were able to ask more fundamentally important questions, and bring together different aspects of the course.

Moving the practical component from SAQs to MCQs was largely based on the limitations on marking (two SAQ components would require too much marking time). It was agreed that if one component of this exam had to be MCQs, it was better for this to be the practical component since answers could not as easily be looked up, and assessors did not have to follow through lines of calculations. Assessing the practicals through MCQs also allowed all 11 practical classes we ran this year to be assessed, instead of just 3 normally covered with the SAQs.

- *Any recommendations to be included in the Chairman's report for taking forward either to the NST Management Committee or to the Board of Examinations.*
 1. Acknowledging that these were difficult times for all, the communication to the Senior Examiners regarding the online examination process still left a great deal to be desired, throughout the year. We would have benefited greatly from clear, consistent and timely instructions. I can outline the many problems we experienced in more detail if requested.
 2. Before we can draw any conclusions about the educational aspect of the examinations, and whether they can be considered 'successful' or not, we need an in-depth survey of all the students, including focus groups. We need to know from them how they found the process, what difficulties they experienced, and to what extent they felt that they were able to demonstrate their knowledge and understanding in the exams. It would also be interesting to know whether any students failed to take the examination process seriously, given the low stakes this year (anecdotally, I felt that more of my 1B supervisees were getting stressed with their exams than normal, on the grounds that this was the first 'proper' exam that they had sat which 'counted').
 3. We need to think carefully about upload times for online exams in the future. The data I have on upload times for my examination strongly suggest that many students were using a substantial amount of the generous, 40 minute upload window to complete their answers.
 4. The main academic problem with running open-book exams that we encountered was self-plagiarism, in particular from supervision essays. We discovered that two students did indeed cut and paste from supervision essays, which had been previously uploaded to Turnitin, but we do not know how many copied from supervision essays which had not been uploaded. The only fair ways to run exams like this in the future would be either to permit self-plagiarism without restriction, or to insist that all supervisors upload all term-time essays into the Turnitin system.
 5. I feel that we are not doing our job as Examiners if we award 67.5% of all students an undivided second class (in a normal year). This huge marks range encompasses very strong students who were just short of firsts, as well as students with low 2.2s who had substantial difficulties with the

material, and it is not fair to bracket them together. It is also unhelpful for those inspecting the students' CVs with a view to offering e.g. lab placements. The undivided second was abandoned in M&VST 1A some years ago for these reasons, and I strongly recommend that NST follows suit.

Date: 6.7.21

(Additional information may be required by Faculty Boards (e.g. question level data); this is not needed by the Chairman of Examiners but can be included if it is easier to provide one report. Faculty Boards may publish certain information and may therefore require content to be presented in a particular format.)

The impact of online examinations (following request for comment from the Chair of Exams)

I have recommended above that we conduct a thorough survey of the students in order to assess the impact of the examination process on them. I don't feel able to comment on this at present.

Speaking as an Examiner, the benefits of the online system included rapid availability of scripts, ease of script distribution and ease of marking typed work. In addition, we noted in our Examiners' Meeting that, when reading hand-written scripts, one can sometimes get a strong impression of the gender or even the nationality of the student writing. This effect is lessened when scripts are typed, and so this may help to reduce unconscious bias. The downside related to the administrative process (below), and the problem of plagiarism.

On the administrative side, we experienced considerable difficulties throughout the year due to mixed messages, changes and late instructions. Senior Examiners were frequently e-mailing themselves, the administrative staff (who did their best but were often also in the dark), UIS and the Moodle Helpdesk, trying to find out how their exams should be run. This caused a great deal of stress and confusion.