

Teaching Committee report to the Faculty Board

Examinations for Parts IA, IB and II of the Tripos, 2000

Introduction

The Committee met four times to consider the examiners' reports on the 2000 Tripos examinations. We also looked at the examination statistics.

We noted with pleasure that the External Examiners, without exception, commented favourably both on the examination process and also on performance of the candidates. The six External Examiners' reports include comments such as '... superb reputation continues to be well justified', 'Part IB of the Tripos is in excellent shape', '... compares favourably with other high-quality mathematics degrees', 'Cambridge clearly continues to attract the best mathematicians in the country', 'the standard of performance in the examinations was excellent', 'the performance of candidates was impressive', 'Part II(B) is comparable to (or even higher than) the standard of courses taught at fourth-year MMath level at other universities'.

There follows a summary of the points raised in the Examiners' reports which we believe need the attention of the Faculty Board.

Severity of examinations

[Various Examiners' reports]

This year's Part IA 1/2(i) borderline corresponded roughly to 24 alphas compared with roughly 32, 28 and 29 in 1999, 1998 and 1987. Marks for all borderlines were substantially lower all round this year than last year.

This year's Part IB 1/2(i) borderline corresponded roughly to 34 alphas, compared with roughly 28, 38 and 31 alphas in 1999, 1998 and 1997.

This year's part II(B) 1/2(i) borderline corresponded roughly to 30 alphas compared with 33 alphas in 1998 (in previous years, the examination was not comparable).

The External Examiner for Part IA drew attention to the comparative difficulty of the examination. He also remarked on the poor performance of candidates below the 2(ii)/3 borderline, but we believe that this may have been a consequence of the severity of the examination rather than of the lack of ability of the candidates. We view the increase in difficulty of the Part IA examination with alarm.

One Part IB External Examiner (DRJC) comments that many students who receive 3rds would fail at other universities. We were not sure exactly what this statement means: surely not that our students, had they studied elsewhere, might fail? The most likely interpretation, given the difficulty of comparing the performance on our non-modular system with that on standard modular schemes used at many other universities, is that the examination did not give the opportunity for such students to demonstrate their knowledge. We noted from the examination statistics that the 'short' questions in Part IB do not seem to be fulfilling their intended role: the take-up rate for 'short' questions is the same as for 'long' questions (and in some cases lower!). We **recommend** that the

Curriculum Committee be asked to investigate this matter as part of the scope of their general review of Part IB.

We noted that the guidelines to Chairmen of Examiners this year had given extra emphasis to the Faculty Board's advice regarding 'short' questions.¹ We **recommend** that these guidelines should be sent by the Secretary of the Faculty Board to all examiners and also that the guidelines be included in the Schedules booklet so that students are made more aware of the intended nature of 'short' questions.

Guidelines on the difficulty of questions

[Part IA, Examiners' report §2]

Two years ago, the Teaching Committee produced guidelines² for the length of a 'short' examination question³ which were later extended to apply to 'long' questions.⁴ The Part IA Examiners thought that these guidelines, had they been adhered to, would have produced questions about 50% too long. The Committee recognises that the guidelines have not made much contribution to solving the problem of questions of unequal standard (but notes that many examiners did not receive them) and that the guidelines give very little help in the case of a 'long' problem-type question.

We are reluctant to abandon the attempt to quantify Tripos questions altogether, particularly in view of the severity of this year's Part IA examination and the apparent unevenness in difficulty of the questions, which was also mentioned in connection with Part II by an External Examiner (ERP). The Teaching Committee will reconsider the matter at a later meeting. One possibility would be provide as a benchmark a few questions from past papers which were judged to be of about the right standard.

¹'Short questions should be accessible to any student who has studied the material conscientiously. They should not contain any significant 'problem' element.'

²These guidelines were produced partly to anticipate the likely criticism from the QAA review team that, because of the non-modularity of the examination papers, there is no means of scaling to take into account anomalously hard questions.

³'Short questions should be accessible to any student who has studied the material conscientiously. They should not contain any significant 'problem' element and it should not take more than about 10 minutes for the examiner to write out a full solution.'

⁴'The 'difficulty' of a long question is determined, in the case of a bookwork question or a question involving a very routine problem, by the length of time it takes the examiner to write out a full solution. For a question with credit 20 marks, this time should be approximately 20 minutes and for a question with credit 30 marks, this time should be approximately 30 minutes. For questions with a problem element, time should be allowed for thinking.'

Alternative merit marks

[Part IA, Examiners' report §11, External Examiner's report para 9; Part IB, Examiners' report §5, External Examiner's report (DSR) para 3, External Examiner's report (DRJC) §3, §4, §5; Part II Examiners' report §6, External Examiner's report (ERP) §6]

Opinions on the alternative merit marks proposed by Dr Cowley range from 'mere curiosities' to 'efforts to be applauded'. One External Examiner commented that the Faculty should have the courage of its convictions to choose and use a merit mark that reflects actual practice. Three of the six external examiners expressed disquiet about the present scheme of alphas and betas.

The two External Examiners for Part IB believe that more credit should be given to alphas on 'long' questions in order to be consistent with the rubric on the examination paper.⁵

We noted that applying the new schemes proposed by Dr Cowley at the final stages of this year's examinations was not a fair test, since both the examiners and the candidates might have used different strategies if one of the alternative merit mark formulae had been in place.

The student members of the Committee pointed out that many students are unhappy about the discontinuities in the merit marks under the present scheme, because of the perceived extra degree of subjectivity. It was also pointed out that alphas are a relatively recent invention and previously classing was managed without any such devices.

In summary, we found that there is considerable unease about the current classification scheme. We therefore **recommend** that the method of classing in all parts of the Tripos be reconsidered, and that the comments of the External Examiners be taken into account in these considerations.

Continuity of examiners, and the burden of Chairmanship

[Part IA, Examiners' report §10, Part IA External Examiner's report, Part IB External Examiner's report (DRJC), Part II External (ERP, JEC) Examiners' reports]

The question of continuity of examiners from year to year was mentioned several times in the examiners' reports, as was the heavy burden placed on the Chairmen. Various suggestions were made.

In Part IA, none of last year's examiners continued to this year and the External Examiner believes that this contributed to the increase in difficulty of this year's papers.

For Parts IB and II, the issues were connected with ensuring that procedures were passed on efficiently from year to year and with reducing the burden on the chairman. Some externals suggest that continuity could be provided by increased logistic support from senior administrative staff (an examinations officer, for example).

⁵Because a double beta on a 'long' question is given less credit than a single alpha on a 'short' question, despite that fact that it represents a greater achievement. This point would not be dealt with by the changing the merit mark algorithms. An External Examiner suggested that the (perceived) anomaly might be removed by means of α/β s. The simpler suggestion of dispensing with double alphas altogether and giving only a beta for a short question and an alpha or beta for a long question was discussed by the Teaching Committee in 1998.

We agree that it is very important to ensure continuity of examiners from year to year but recognise that continuity is already an important criterion in choice of examiners and that it is often difficult to find suitable examiners. We hope that in future there will always be some continuity between years. We **recommend** that Heads of Department should be asked to consider the practicality of nominating one examiner in each Tripos in the expectation that he or she would continue for two years and be Chairman in his or her second year. Such an examiner might be officially called a Deputy Chairman as in the Natural Sciences Tripos.

External Examiners remarked on the difficulties caused by staffing problems in the Faculty Office, and that these were compounded by the partial move to Clarkson Rd. These difficulties should not recur. Nevertheless, we **recommend** that the practicality of appointing an administrative examinations officer is considered.

Structure of Part II

[Part II External's report (ERP), page 2(i); JEC, page 3; NHB page 1]

All three External Examiners comment on the structure of Part II. NHM thinks it is too complicated, and is concerned about the comparability of the two Alternatives; JEC wonders whether the costs of having two alternatives outweigh the benefits; ERP believes that the difference in philosophy between the two Alternatives is not clearly enunciated and that students might be confused. (We noted that the increase in the proportion of students taking Part II(B) may be taken as evidence for this view.) Two of the External Examiners make comparison with a modular system (one paper per course). We **recommend** that the Curriculum Committee be asked to consider these points when they discuss the knock-on effects of their proposals for Part IB. We also **recommend** that more guidance about the philosophy underlying the Alternatives be given in the Schedules booklet, perhaps along the lines of the paper prepared in anticipation of the QAA review team's enquiries on this matter.

Timing of Examiners' meetings

The matter of lack of time between receiving the scripts and the final meeting arises annually, especially in connection with late scripts. In particular, for the Part IB examination, scripts taken in College on the Friday not received until the following Tuesday.

The Part II Examiners' meeting normally takes place on the Saturday before the Thursday on which the examination results come out. Next year's examiner should bear in mind that the meeting could be put back until (say) Tuesday without delaying the publication of the results. Similar alterations in timing for Parts IA and IB would delay the publication of the result and might be thought undesirable but might also be thought necessary. We **recommend** that the examiners for 2001 give careful consideration to the timing of their final meetings in the light of the views expressed by this year's examiners.

Computational Projects

[Part IB External Examiner's (DRJC) report, §2, Part II External Examiner's (JEC) report, page 3]

Two External Examiners comment that the work involved in submitting Computational Projects may be too great for the examination credit reward. We did not feel strongly about this, but **recommend** that the Faculty Board considers these comments.

Provision of checkers

[Part IB Examiners' Report, bottom of page2]

The Part IB examiners mention difficulties in providing checkers. We **recommend** that the current arrangements, including the rate of pay (which is less than one third of the supervision rate) the question of whose responsibility it is to provide checkers and the possibility of employing temporary clerical staff (cf. invigilators), be reviewed.

Templates

[Part IB Examiners' report; Part II External (ERP) Examiner's report]

The use of a template for model solutions and draft mark schemes was thought very desirable and we **recommend** that practice be continued. The column headed 'Source and/or comments' should be headed 'Comments', to remove ambiguity.

Seating in the Part IA examination

[Part IA, Examiners' report §4]

The Part IA Examiners **recommend** that candidates for the Mathematics with Physics and Mathematics with Computer Science options be seated together and in the same place for each paper (this year, they sat in different places for different papers). We think that this is sensible.

Part IA mark processing programme.

[Part IA, Examiners' report §7]

The Part IA Examiners **recommend** that the mark processing programmes should be altered so that marks cannot be given to candidates who have withdrawn before the start of the examination (this applies to all parts of the Tripos), and that candidates for Part IA cannot be given marks for the two of Papers 4, 5 and 6 that they are not taking. We think that this is sensible, but note that this places an extra burden on the Computer Officer.

Marks for Papers 5 and 6 of Part IA

[Part IA Examiner3s' reports §8]

We agree with the Examiners that the method of incorporating the marks for Papers 5 and 6 needs careful consideration. We feel (while noting that the External Examiner is satisfied that all candidates were correctly classed) that the method proposed is unsatisfactory for a number of reasons and suggests, for example, that the method of comparing class boundaries and then using piecewise linear scaling as used in the Natural Sciences Tripos may be more satisfactory. We **recommend** that the Faculty Board, in consultation with the Chairman of the examiners, produce guidelines in good time for the 2001 Part IA examinations.

Assessors for Papers 5 and 6 of Part IA

[Part IA, Examiners' report §9]

The Part IA Examiners **recommend** that the assessors for Computer Science and for Physics be invited to attend the first part of the final examiners' meeting. We think that this would be good practice.

Comments on examination questions

[Part IB External Examiner's (DJRC) report, Part II External Examiner's (ERP) report]

Dr Chillingworth (also Dr Priest) **recommends** that comments on examination questions be sent to the following year's examiners and also to the following year's lecturers (who would find them useful both as lecturers and in view of their contribution to the examining process). We think that this is a good idea.

Personal circumstances of candidates

[Part IB External Examiner (DRJC), top of page 3].

Dr Chillingworth is of the opinion that the examiners should take into account illness and other factors in the classing of students. This matter was discussed in the Joint Report of the Council and the General Board on the review of examination results of students other than Graduate Students (see Reporter, 1999/2000 p 956), the principal recommendation of which was the introduction of a formal review procedure for such examinations. The report is to be Graced in the near future. It should go some way towards meeting the concerns expressed by Dr Chillingworth.

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