Examiners' Report: Preliminary Examination in Mathematics and Philosophy Trinity Term 2021

January 28, 2022

Part I

A. STATISTICS

(1) Numbers and percentages in each class

See Table 1. Overall, 20 candidates were classified.

Table 1: Numbers in each class (Preliminary Examination)

	Numbers					Percentages %				
	2021	(2019)	(2018)	(2017)	(2016)	2021	(2019)	(2018)	(2017)	(2016)
Distinction	7	7	6	4	7	35	35	42.86	23.53	50
Pass	11	11	7	13	4	55	55	50	76.47	28.57
Partial Pass	2	2	1	0	3	1	10	7.14	0	21.43
Fail	0	0	0	0	0	0	0	0	0	0
Total	20	20	14	17	14	100	100	100	100	100

(2) Vivas

No vivas were given.

(3) Marking of Scripts

In Mathematics, all scripts were single marked according to a pre-agreed marking scheme which was strictly adhered to. There is an extensive checking process. In Philosophy, all scripts were single marked except for failing scripts, which were double-marked.

B. NEW EXAMINING METHODS AND PROCEDURES

In light of the ongoing COVID-19 pandemic, the University changed the examinations to an open-book format and rolled out a new online examinations platform. An additional 30 minutes was added on to the exam duration to allow candidate the technical time to download and submit their examination papers via Inspera.

C. CHANGES IN EXAMINING METHODS AND PROCEDURES CURRENTLY UNDER DISCUSSION OR CONTEMPLATED FOR THE FUTURE

The departments intends to hold in person exams in Trinity Term 2022.

D. NOTICE OF EXAMINATION CONVENTIONS FOR CANDIDATES

The Notice to Candidates, containing details of the examinations and assessment, including the Examination Conventions, was issued to all candidates at the beginning of Trinity term. All notices and examination conventions in full are on-line at https://www.maths.ox.ac.uk/members/students/undergraduate-courses/examinations-assessments/examination-conventions.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

Timetable

The examinations began on Monday 21st June and ended on Friday 25th June.

Mitigating Circumstances Notices to Examiners

A sub-set of the Examiners (the 'Mitigating Circumstances Panel') attended a pre-board meeting to band the seriousness of circumstances for each factors affecting performance application received. The outcome of this meeting was relayed to the Examiners at the final exam board, who gave careful regard to each case, scrutinised the relevant candidates' marks and agreed actions as appropriate.

Determination of University Standardised Marks

For the papers that are common with Mathematics, the examiners followed the standard procedure for converting raw marks to University Standardized Marks (USM), and used the same scaling functions as applied for candidates in Mathematics.

Recommendations for Next Year's Examiners and Teaching Committee

There are no recommendations specific to Mathematics & Philosophy. General recommendations are made in the report on the Preliminary Examination in Mathematics.

B. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

The breakdown of the final classification by gender is as follows:-

Table 2: Breakdown of results by gender

Class	Number								
	2021			2019			2018		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Distinction	1	6	7	0	7	7	1	5	6
Pass	1	10	11	6	5	11	4	3	7
Partial Pass	2	0	2	2	0	2	1	0	1
Fail	0	0	0	0	0	0	0	0	0
Total	4	16	20	8	12	20	6	8	14
Class	Percentage								
	2021			2019			2018		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Distinction	25	37.5	31.25	0	58.33	35	16.67	62.5	42.86
Pass	25	62.5	43.75	75	41.67	55	66.67	37.5	50
Partial Pass	50	0	25	25	0	10	16.67	0	7.14
Fail	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	100

C. STATISTICS ON CANDIDATES' PERFORMANCE IN EACH PART OF THE EXAMINATION

Mathematics I

Question	Maths and Philosophy		Single School	
	Mean	Std Dev	Mean	Std Dev
Q1	14.11	14.11	2.97	18
Q2	10.07	10.07	6.61	15
Q3	16.83	16.83	3.00	18
Q4	12.29	12.29	4.07	7
Q5	15.47	15.47	4.67	17
Q6	10.5	10.5	4.04	6
Q7	13.47	13.94	5.32	16

Mathematics II

Question	Maths and Philosophy		Single School	
	Mean	Std Dev	Mean	Std Dev
Q1	14.22	14.22	4.24	18
Q2	13.64	13.64	4.90	11
Q3	10.45	10.45	6.01	11
Q4	10.74	10.74	2.75	19
Q5	9.17	9.17	6.68	6
Q6	15.47	15.47	5.46	15
Q7	8.9	8.9	4.68	20

Mathematics III(P)

Question	Maths and Philosophy		Single School	
	Mean	Std Dev	Mean	Std Dev
Q1	17.05	17.05	4.30	20
Q2	11.73	11.73	4.94	11
Q3	10.78	10.78	6.24	9
Q4	12.59	12.59	3.45	17
Q5	10.63	10.63	3.61	16
Q6	11.43	11.43	3.36	7

Elements of Deductive Logic

AvgUSM	StdDevUSM
64.1	-

Introduction to Philosophy

AvgUSM	StdDevUSM
62.2	-

D. COMMENTS ON PAPERS AND ON INDIVIDUAL QUESTIONS

See reports from Mathematics Examiners for Mathematics questions.

Report of Elements of Deductive Logic

This report on the EDL paper covers students in Computer Science & Philosophy (15 candidates), Maths & Philosophy (20 candidates), and Physics & Philosophy (15) candidates).

Comments on single questions

Question 1 (19 answers). This was the question with the worst performance, but also some answers that were close to being perfect. There was a typo in part (a)(ii), but most students who attempted this question corrected for this themselves. Many students did not attempt the final question.

Question 2 (41 answers). In (c) candidates often specified an interpolant that was not of minimal length. Proofs were often incomplete or very compressed.

Question 3 (8 answers). This question is inspired by the Gödel incompleteness theorems, as the provability in arithmetic behaves in relevant aspect as the predicate symbol P in Γ. The question had the least attempts, but those who did attempt it generally did very well. The claim in a(v) is incorrect.

Question 4 (24 answers). This was a question about translations between English and the language of predicate logic. Most answers to the formalization question in (b) were basically correct, but contained often more or less minor mistakes. There were different correct approaches to the formalization of (b).

Question 5 (40 answers). This question was mostly well done, but many students struggled with the relatively simple part (b), resulting in often rather long proofs. In question (d), despite the fact that the question explicitly asked for a fully specified and unique structure, some students forgot to define an extension for all sentence letters, predicates and constants.

Question 6 (22 answers). Most candidates clearly had a good idea of the proof strategies, but often struggled somewhat with writing down precise inductive proofs.

Question 7 (30 answers). This was both one of the most popular questions and the question with the highest average mark. In part (b), some students did not see that, for instance, the sentence $P \wedge \neg Q$ becomes a contradiction when we replace P with Q.

Question 8 (16 answers). This was mainly a question about compactness. The consequence relation in (c) is based on quantification over models that

contain constants for all objects. Consequently compactness fails for such a definition. Many answers were incomplete.

Frege Questions

Question 9 (7 answers). Although the question is fairly standard, the answers were of mixed quality with some very good, but also somewhat muddled questions. Some candidates gave general reasons why Frege thought that such equations and all of arithmetic are analytic without paying much attention to the specific question about equations with relatively large numbers and the problems this poses for Kant, according to Frege. It was the question with the lowest average.

Question 10 (7 answers). This proved to be a demanding question. Some candidates were confused about some basic expectations that one may expect definitions to satisfy.

Question 11 (3 answers). This very straightforward question attracted only 3 answers.

Question 12 (10 answers). This was the most popular question and the question with the highest average.

Question 13 (1 answers). This was the question with the fewest answers. Possibly a lack of knowledge of the technical details of second-order logic kept some candidates from answering the question, although a good answer need not have to be highly technical.

Question 14 (8 answers). Some answers were muddled, and the reasons for or the derivation of the inconsistency of Frege's system did not become very clear. Most candidates discussed Hume's Principle instead of Basic Law V as a way to restore the consistency of the system, which is of course the most popular way of restoring consistency among neo-logicists. Restrictions on second-order logic would have been another way of restoring consistency.

2. Mitigating Circumstances Notices to Examiners

7 notices were received and carefully considered. All penalties for late submissions were waived.

E. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

- Prof. Volker Halbach (Chair for Preliminary Examinations)
- Prof. Dan Ciubotaru
- Dr Richard Earl

- Prof. James Read