

NST Part IB History and Philosophy of Science
Senior Examiner's Report
October 2023

1. The examination process

As in previous years, the Part IB HPS examination consisted of two papers: History of Science (HPS/1), and Philosophy of Science (HPS/2). The examiners were Matt Farr (senior examiner), Mary Brazelton, Tim Lewens, Joshua Nall, Marta Halina, Dániel Margócsy. There was no external examiner.

Candidates sat two three-hour open-book online exam papers: HPS/1 (History of Science) and HPS/2 (Philosophy of Science). For each exam, candidates answered 4 questions from a choice of 12 (1 out of 2 Section A questions; 3 out of 10 Section B questions). For each exam, students were given a 5-hour window between receiving the exam paper and submitting their exam scripts.

The HPS/1 exam took place on Tuesday 23 May 2023, and HPS/2 on Tuesday 13 June 2023. There were no notable incidents during the examinations, to the examiners' best knowledge. All candidates with registered disabilities were accommodated appropriately, also to the examiners' best knowledge.

Drs Brazelton, Nall, and Margócsy read the History of Science scripts, and Drs Farr, Halina, and Lewens read the Philosophy of Science scripts. Each script was blind double-marked. On each paper, any given examiner read 2/3 of the scripts, the rota being arranged so that each pairing of examiners was assigned 1/3 of the whole set. A numerical mark out of 100 was given by each examiner to each script as a whole, and that mark was agreed between the two examiners in each case; in very few cases, agreement was reached with the help of the remaining examiner. Although each script was marked by individual examiners question-by-question, final marks for candidates were agreed between the two markers based on their overall marks for the candidate, although where there were disagreements in these marks, individual question marks were discussed and considered.

Due to the Marking and Assessment Boycott (MAB), the examiners' meetings took place in October 2023. The HPS Part IB Final Examiners' Meeting was held on October 4th, to agree all marks and discuss any issues. In preparation for this meeting, the two groups of three markers of each paper met independently with the Senior Examiner on October 2nd (HPS/2) and October 3rd (HPS/1) to discuss each script in detail.

2. The subject examiners' meeting, and recommendations arising from it

The HPS Part IB Final Examiners' Meeting on October 4th was attended in-person by all examiners. Marks on the individual papers, HPS/1 and HPS/2, had all been agreed at the prior meetings on October 2nd and 3rd, and were combined to provide an overall mark for

each candidate. The agreed raw marks did not meet the expected grade distribution and so the scaling formula was used.

3. Summary of results

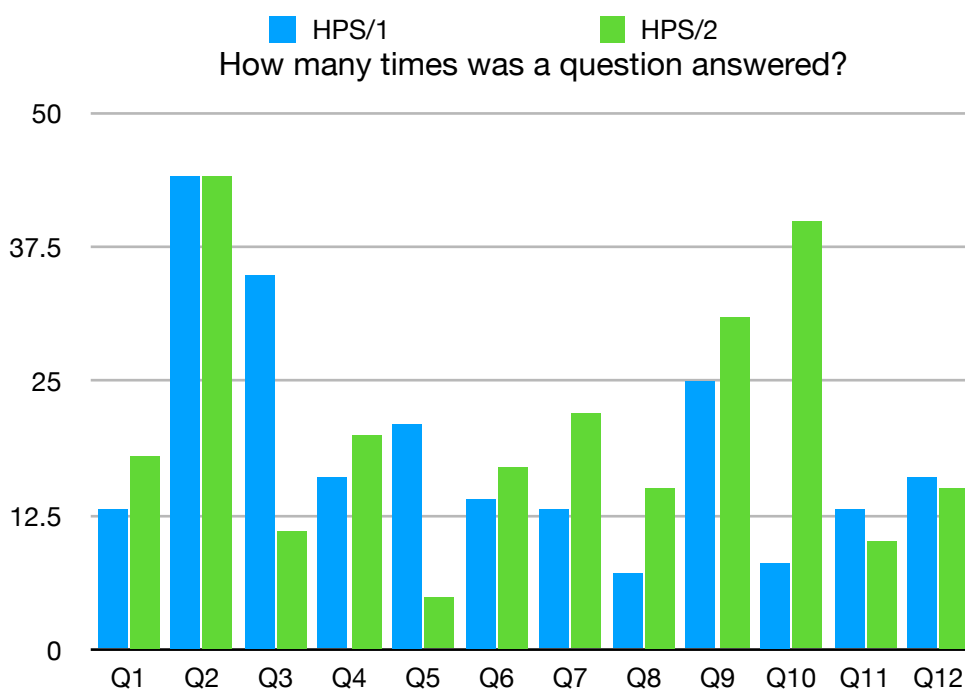
A total of 47 NST candidates sat both exams, 8 non-standard candidates sat HPS/1, 15 non-standard candidates sat HPS/2. After scaling, the results consisted of 21.28% firsts, and 61.7% firsts-and-2is. The average mark was 62.65 and standard deviation 7.14. 2 candidates withdrew.

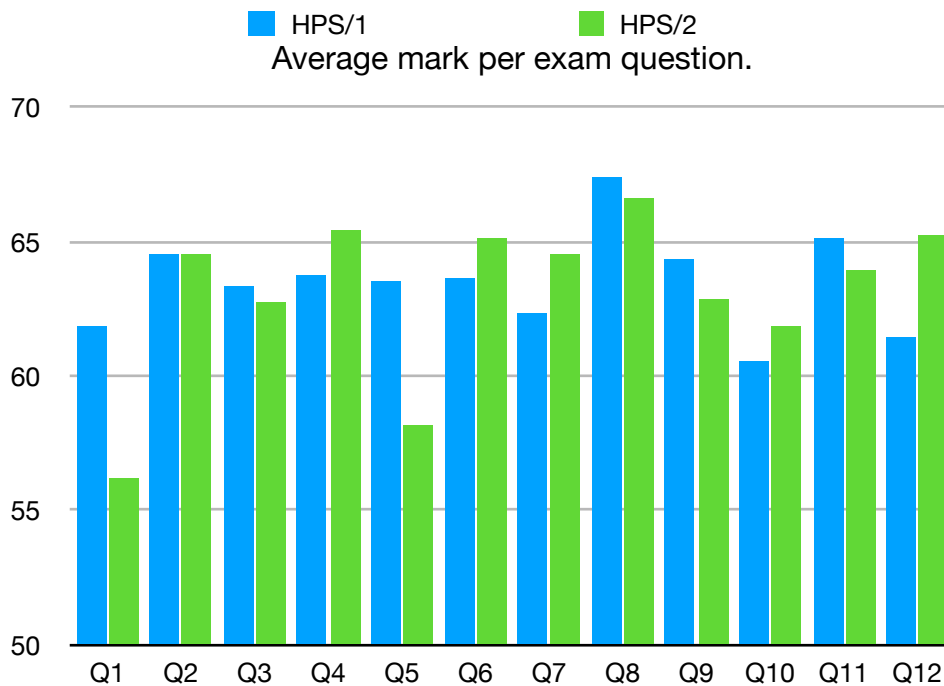
4. Comments on performance on individual questions

As in previous years, there was some unevenness in the distribution of candidates tackling different questions. For Section A, there was unevenness on both exams: on both there was a strong preference for Q2 (44 out of 57 for HPS/1; 44 out of 62 for HPS/2). For Section B, there is an uneven distribution on both exams. For HPS/1, there was a spike on Q3 (35 out of 57 candidates chose this), and smaller spikes on Q5 and Q9. For HPS/2, Q10 was answered by two-thirds of the candidates (40 out of 62). This was a question on Kuhn, such questions seeing large spikes also in previous years. Similarly, it was not unexpected, given previous years, that the second most popular Part B question for HPS/2 was the Popper/Falsificationism question, which attracted half of the candidates (31/62). It has been remarked in previous years that Popper and Kuhn questions tend to prove most popular on the HPS/2 exam.

Distribution of questions answered

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
HPS/1	13	44	35	16	21	14	13	7	25	8	13	16
HPS/2	18	44	11	20	5	17	22	15	31	40	10	15





Average mark per question

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
HPS/1	61.8	64.5	63.3	63.7	63.5	63.6	62.3	67.4	64.3	60.6	65.1	61.5
HPS/2	56.2	64.5	62.7	65.4	58.2	65.1	64.5	66.6	62.8	61.8	63.9	65.2

History of Science (HPS/1)

Section A

Q1. How have gender roles shaped the making of science and/or medicine?

Answers tended to focus on the early modern part of the course and treatment of the modern period was very sketchy. This may reflect differing emphasis on gender by different parts of the lecture course.

Q2. Was colonialism the main driving force behind the development of natural knowledge between 1500 and 1950?

This was by far the more popular of the Section A questions (44/57). The best answers tried to account for the full time period covered in the question, though many answers struggled in doing this. A common issue was to treat war as independent from colonialism as a driving force in the production of natural knowledge.

Section B

Q3. Was the early modern period an age of discoveries and inventions?

This was the most popular Section B question, with 35/57 candidates answering it. The most common strategy employed was to impose a contemporary idea of discovery onto the early

modern material in the course and then to list events covered in the lectures on early modern natural knowledge. The best answers drew on material from the first lecture to interrogate what discovery and invention meant for the period in question, and also tended to point out that discovery meant different things in different parts of the world, with the strongest answers discussing the relationship between natural inquiry and classical knowledge.

Q4. Was Isaac Newton the typical early modern natural philosopher?

The best answers to this question demonstrated awareness both of traits common to many early modern natural philosophers (high social class, use of instruments, sociability) and those distinctive to Newton (occultism and religious fervor, idiosyncratic and unclear writing style); the best accounts also rejected the 'lone genius' theory of scientific explanation.

Q5. How did the Enlightenment transform scientific practice?

The best answers discussed matters of global pillage, mechanistic philosophies and Newton and Descartes, experiments and instruments. The French Revolution was a tricky topic – it is germane to the question, especially the material on medicine, but too often students focused on it in a way that moved to the post-Enlightenment era.

Q6. How did early modern natural philosophers set themselves apart from their medieval predecessors?

The best answers paid attention to the question's request to discuss how early modern natural philosophers 'set themselves apart' from medieval counterparts; the weakest answers just listed differences between early modern and medieval natural philosophers.

Q7. How, if at all, did imperial competition have an impact on the history of medical sciences in the late nineteenth and early twentieth centuries?

The weakest answers regurgitated prepared material on science and empire, writ broadly; the best answers engaged with the term 'imperial competition' carefully, and pointed out the ways in which competition was a dynamic that could be traced within as well as between empires, and also could be contrasted with cooperation of various forms.

Q8. What was at stake in stratigraphic work during the nineteenth century?

This question was the least popular; it only had three responses. Many respondents struggled to define stratigraphy and just read it as a shorthand for geology.

Q9. How did chemical industries support national self-sufficiency in the twentieth century?

This was a popular question. The best responses paid attention to the mention of 'national self-sufficiency' and took some time to define how they were using this term in the essay. The best answers also discussed relationships between industry and state. The weakest answers simply summarized the Haber-Bosch process.

Q10. Did molecular perspectives on heredity put an end to eugenic thinking?

This question was unpopular, with only five responses. The strongest responses defined eugenics, introduced molecular biology, and explained the relationship between the two with

reference to readings and lectures; the weakest responses straightforwardly assumed a decline in eugenics after World War II.

Q11. *In what way did patients get more of a say over medical research since the 1970s?*

The best answers attended to the term ‘patients’ in the question, keeping the focus of discussion on medical research (with examples discussing the revelation of Tuskegee, ACT UP and AIDS activism, and Black Panther Party work in the medical sphere) and the doctor-patient relationship—as opposed to broader issues of bioethics or science and the public more generally.

Q12. *Is “the Anthropocene” a productive term to think about the world we live in?*

The best answers defined the term ‘Anthropocene’ before trying to make an argument for why it was or was not a productive term. The weakest responses used the question as a prompt to simply give opinions on climate change, or read ‘productive’ as ‘accurate’ in the question.

Philosophy of Science (HPS/2)

Section A

Q1. *Are there any features shared by all, and only, the sciences?*

This question was widely interpreted as concerning the demarcation between science and pseudoscience rather than between science and other non-scientific practices. The responses to this question received the lowest average mark (56.2%). The better responses considered the varying features of different sciences and focussed on what aspects of scientific method are indeed shared by different putative sciences, looking for commonalities and differences.

Q2. *Do values influence scientific reasoning?*

The majority of answers to this question considered the lectured material on the value-free ideal. The best answers specified what is meant by scientific reasoning, the difference between epistemic and nonepistemic values, and whether the role of values is pathological in science. Many essays tied values too closely to failure of objectivity.

Section B

Q3. *Should we use public money to pay for curiosity-driven research?*

There was a tendency for answers to this question to focus simply on the question of curiosity-driven research is a good thing. The better essays mentioned and considered in detail the issue of funding and public money.

Q4. *Should theories in physics be empirically testable?*

This was a relatively popular and generally well-answered question. While there was a tendency to view the question of empirical testability and empirical support for theories as an

'all of nothing' issue, the best answers considered the idea that there are degrees of empirical support.

Q5. *Is there such a thing as “absolute space”?*

The least-answered question. In this small group, the essays were of mixed quality. In particular, there was not enough focus on the questions of absolutism vs substantialism vs relationalism.

Q6. *“No proper scientific explanation of social phenomena is possible.” Discuss.*

This was reasonably popular and clearly-argued question. The weaker essays were written as though the title was “is social science really a science”, focusing on that issue rather than a direct response. The better answers looked at the notion of scientific explanation and whether its fair to apply it to social science.

Q7. *What is the explanatory gap? Can it be bridged?*

Answers to this question received a good average mark. The weaker essays focussed mainly on dualism, and offered summaries of theories of consciousness and the mind-body problem in general rather than addressing the question at hand. Better essays focussed on the origin of the 'explanatory gap' and the distinctions between the 'easy' and 'hard' problems of consciousness. The best answers focused on a single theory of mind (e.g. functionalism) and how it understands and addresses the explanatory gap.

Q8. *Is there any sense in which natural selection requires struggle?*

On average, the best-answered question in the paper. Most focussed on the debate between Godfrey-Smith and Lewens. The better answers also discussed and understood the work of Krasniak.

Q9. *“If falsificationism were as problematic as philosophers have suggested, it would never have been as popular among scientists.” Discuss.*

This was a popular (see above) question that achieved slightly lower-than-average marks. Due to the popularity of the 'Popper' question in previous HPS/2 exams, it was not overly surprising that many candidates wrote a broader 'falsification essay' rather than answering the question as it was posed. This question is a counterfactual, but most essays did not properly analyse the status of this counterfactual. Very few queried whether scientists actually do follow a strictly Popperian falsificationist method.

Q10. *According to Kuhn, what is it that changes when a scientific revolution happens?*

There was very little variation as to how this question was answered, leading to suggestions from the examiners not to include such a 'generic' Kuhn essay question in future exams. Although the answers were generally good, the question appears not to have encouraged sufficient independence. Better answers did choose a more focused answer and systematic way of answering the question.

Q11. *To what extent is pluralism compatible with objectivity?*

The second-least-popular question. Most tackled the work of Feyerabend and Longino. Better answers showed a clear grasp of objectivity and pluralism grounded in the literature. Some answers went further and answered not just whether pluralism is compatible but also whether it can play a central role in scientific objectivity.

Q12. *Is evidence from randomised trials necessary and sufficient to conclude that a medical intervention is effective?*

The best answers to this question separated necessary and sufficiency and looked at alternative set-ups like observational studies as well, or else addressed whether medical intervention is effective and how another thing could fill that gap.

5. Ideas for future years.

Examiners were happy to continue with typed as opposed to handwritten scripts, but there was some support for alternative assessment methods to be introduced in the long term. One chief concern is the existence of AI language models and the potential for these to be widely used in open book formats. We also discussed the need for a clearer marking rubric, especially for guidance on marking essays that appear to have the strengths of, say, a 2:1 or 1st, but the weaknesses of a 3rd.