

NST Part IB HPS Senior Examiner's Report

June 2010

1. Summary

Scripts were marked in a timely fashion and marks were agreed with the assistance of the External Examiner, to whom the Paper Examiners are grateful. As usual, there were a number of candidates taking the examinations in College or elsewhere. The arrangements for delivery of these scripts were satisfactory, although the Senior Examiner was placed in a position of not knowing quite why a script was missing for a brief period of time which, given the few days the Examiners to complete their task, was rather disconcerting.

2. Candidates and Classes

77 candidates were entered for the examination. 1 candidate was absent from the examination and 1 candidate withdrew before the examinations began. Included in the figures in the table below is 1 candidate who took NST Part II Physical Sciences and 1 candidate from MIT, both of whom took both HPS Papers. In addition, there were 3 MIT candidates who took 1 paper (2 History, 1 Philosophy) by special dispensation and 1 Education Tripos candidate who took the History paper; these 4 single-paper candidates and the absent and withdrawn candidates are not included in the table below (but are included in the above total of 77 candidates entered for the examination).

Classes are not awarded by IB HPS Examiners but the agreed marks fall into the following classes according to the NST classing criteria, shown here alongside previous years.

Class	2010	2009	2008	2007	2006	2005	2004
1 (70-100)	9 13%	15 18%	7 12%	16 27%	13 19%	13 13%	9 9%
2i (60-69)	34 48%	37 45%	27 46%	22 37%	29 42%	46 47%	56 52%
2ii (50-59)	24 34%	26 32%	25 42%	22 37%	27 39%	35 35%	40 37%
3 (40-49)	4 6%	3 4%	0 0%	0 0%	0 0%	4 4%	0 0%
Fail (0-39)	0 0%	1 1%	0 0%	0 0%	0 0%	1 1%	0 0%
Total	71	81	59	60	69	99	107

The NST requires that 60% of candidates receive a mark of 60.0 or above, to one decimal place, with a deviation < 2 scripts. This requirement was met.

Since 2005 Senior Examiners' Reports have included a gender breakdown. The breakdown for this year's examination is supplied with the previous two years for comparison:

Class	2010		2009		2008	
	M % of total	F % of total	M % of total	F % of total	M % of total	F % of total
1	5 7%	4 6%	10 12%	5 6%	2 3%	5 9%
2i	18 25%	15 21%	22 27%	15 19%	11 19%	16 27%
2ii	15 21%	9 13%	12 15%	13 16%	11 19%	13 22%
3	0	4 6%	2 2%	1 1%	0 0%	0 0%
Fail	0 0%	0 0%	0 0%	1 1%	0 0%	0 0%
Total	38 54%	32 45%	46 57%	35 43%	25 42%	34 58%

The gender of the candidate taking Part II Physical Sciences (who was awarded a II.i.) was not supplied, so that the total of gendered individuals is 70, not the 71 who are included in the first table.

Given the variation in gender balance year on year, itself probably of little significance, little of any significance can be said about these figures. Perhaps there is cause for concern in the fact that of the 10 candidates scoring less than 55 overall, 8 were female, but it is highly likely that this figure is a product of small sample fluctuation. There certainly does not appear to be any gender imbalance in performance at the upper end of marks awarded.

3. General Performance of Candidates

Three candidates achieved marks of 35 or above on both History and Philosophy papers. There was clear water (nearly 4 marks) between these three outstanding candidates and the six others who achieved an overall HPS mark above 70.

Stronger answers combined an impressive degree of knowledge with analytic rigour, direct treatment of the question at hand and on occasion adventurousness in approach and content. Weaker answers suffered from lack of relevance and the unfortunate familiar tendency to regurgitate lecture material without properly engaging the question. As last year's Senior Examiner's report noted, the difference between a 2.i and a 2.ii answer often depends, not on the quantity of material employed, but *how well* that material is used to answer the question. This is especially the case when the same material is used by a very large number of students as it inevitably is for the most popular questions in both History and Philosophy examination papers.

Detailed comments by the Examiners on the two Papers and on the answers to each of the questions are included below.

General Remarks

The Examiners discussed some of the issues that had been raised in last year's examining process, particularly by the External Examiner, concerning

1. A possible reform of the IB Philosophy of Science syllabus so it was less centred on general philosophy of science of a somewhat dated sort
2. The reform of the HPS course so that students can make significant connections between the sciences they are studying in parallel with HPS, in particular so as to give pertinence to philosophical analysis.
3. The combination of History and Philosophy across papers and different parts of the course.

The Examiners noted that the Teaching Officers in the Department would be considering such reforms of the IB HPS syllabus and teaching in the course of the current year.

A handwritten signature in black ink, appearing to read "John Forrester". The signature is fluid and cursive, with a long horizontal stroke at the end.

Prof. John Forrester, Senior Examiner

17th December 2010

Paper 1. History of Science.

General Remarks

There was no discernable aversion amongst candidates to specific periods or questions relating to particular sciences or areas of natural philosophical study. There were less endemic errors in this year's scripts. Historiographically complex issues, (in)advertently raised by the phrasing of questions – the term “success” applied to Darwin's *Origin*, the term ‘globalised’ – did elicit some less controlled and reflective responses from candidates. Overall, however, the examiners were impressed by the fluency with which candidates dealt with an impressive range of historical eras and topics.

Question-specific comments (Number of answers in brackets)

1. To what extent does the concept of “Big Science” apply to historical periods other than the decades following World War II? (33)

No candidate introduced the concept of ‘industrialisation’, which could be argued to be the most significant feature of Big Science. Attempts at addressing question of scale were often only fitful, even when the candidate emphasized this (e.g. the Manhattan Project being larger than the automobile industry). Many candidates devoted too much time to describing Big Science in the period following World War II. Few candidates noted that ‘Big Science’ was introduced as a critical, not a descriptive, concept.

2. Does the history of science provide a firm basis for the distinction between “science” and “technology”? (35)

Many candidates did not systematically distinguish ‘technology’ from ‘scientific instruments’. Few candidates had much knowledge of classic examples of past technology (from agriculture and building to mining and ship-building). Few candidates made the obvious link between changes in the relations of scholar and craftsman that they may have then discussed in answering questions 4 and 5, nor did they link the questions about navigation and astronomy with the history of technology. A few answers did raise historiographical issues concerning the difference between ‘history of science’ as ‘what happened’ and ‘history of science’ as a body of texts about ‘what happened’.

SECTION B

3. Compare attitudes to the origins and purpose of science and scholarship in ancient versus medieval Iraq. (14)

There were some very good answers to this question. The better answers had clearly gone beyond the content of the lectures and tried to develop nuanced historical accounts.

4. **Either** (a) “The passages and variations of nature cannot appear so fully in the liberty of nature, as in the trials and vexations of art” (Francis Bacon, 1605). Discuss. (9)

The answers to this question were not very strong. Less satisfactory answers failed to contrast the vexations and the prior right ordering of natural philosophical knowledge. Few answers linked the quote to 'craft'.

Or (b) How did the limits of what could be known about the natural world change between 1500 and 1700? (24)

Few answers focussed on the 'limits' that the question asked for. Better answers raised the very small, the very distant, the perceptible and the imperceptible.

5. What was new about natural philosophy and medicine in early modern Europe? (34)

No answers focussed principally upon 'the new'. There was a tendency for answers to overlap with answers to Q4(a) and Q4(b). The Examiners marked down such overlap. Better answers preserved a balance between natural philosophy and medicine.

6. How globalised were the sciences in the eighteenth century? (11)

Few answers analysed sufficiently the concept of 'globalisation'; poorer answers equated it with 'travel'. Few answers discussed the physical sciences.

7. What effect did the French Revolution have on the sciences and medicine? (37)

Remarkably few candidates discussed the foundation of the Grandes Ecoles. Some of the stronger answers discussed the impact of the Revolution and its aftermath on England and Prussia. The focus was excessively on medicine, despite the question asking about the sciences as well.

8. **Either** (a) What did the success of the *Origin of Species* owe to earlier debates about evolutionary theories? (34)

Many students did not know how to address pertinently and succinctly the assumption of 'success' in the question. Candidates often represented Lamarck's theory as being centred on the inheritance of acquired characteristics. Some answers were damaged by modern versions of Darwinian theory being imposed upon the *Origin*.

Or (b) To what extent is the Modern Synthesis in evolutionary theory based on Mendel's work? (8)

Poorer answers assumed that Darwin's theory required Mendel in order to be complete, as if there were historical inevitability in the production of the synthesis. One strong answer did focus principally on Mendel in order to demonstrate how different from the Mendel of the Modern Evolutionary Synthesis he actually was.

9. **Either** (a) How did germs become objects of science? (9)

This question lent itself to a rather unimaginative run-through of a series of key experiments. There were a few very strong, analytically engaged answers, covering national rivalry and public engagement of science.

Or (b) "Medical science was exactly like other sciences, except that it took as its object the human in health and disease." Assess this claim for nineteenth-century Europe. (6)

Many of the answers were uncertain what to focus on in this question and the answers were very variable in response, some concentrating on the study of germs. Few made the assumption that there was a standard scientific method in the C19. Better ones addressed the location where science and medicine were practised. Fewer than the examiners anticipated focussed on the laboratory.

10. Why was the ether so important in nineteenth and early twentieth-century physics? (6)

Many answers focussed on the demise of the ether, not its importance. Fewer answers than expected discussed the role of the ether in Maxwell's and the German physicists' theorisations of electromagnetism. A strong answer focussed on the weight of scientific achievement that the ether came to symbolise.

11. Why did James Watson and Francis Crick hope to solve the problems of biology using the "sharp, non-emotional thinking" of physics and chemistry? (Watson) (12)

Poorer answers accepted that physics and chemistry actually do encourage "sharp, non-emotional thinking" and that the role of the physics and chemistry were the same.

12. What do the histories of electroconvulsive therapy and psychoanalytic psychotherapy tell us about the broader history of psychiatry? (5)

Strikingly varied answers. One answer was admirably ambitious in the scope of its coverage. No answers took control of the question, as invited, by sketching a broader history of psychiatry.

Paper 2 Philosophy of Science

General Remarks

As in previous years, the examiners noted the prevalent tendency to answer a number of questions by using a discussion of Kuhn and Popper.

Question-Specific Comments (Number of Answers in Brackets)

Section A

1. Common-sense beliefs hinder science." Discuss.(47)

A number of these answers were good, with students going well beyond the lecture notes and reading material to develop insightful essays. A slightly larger number were fairly routine, relying mainly on lecture material.

2. Is there a unitary philosophy for all the sciences, or are there only specialised philosophies for each of the sciences? (26)

The best group of these essays (there were a few) considered core problems in philosophy of science from the perspective of different sciences, such as physics and biology. A number of essays were fairly pedestrian, dumping lots of information about Popper and Kuhn.

Section B

3. What is the best account of causation? (40)

Most of these essays were little more than repetition of lecture notes. Only a few went substantially beyond them.

4. Are explanations arguments? (14)

A few of these essays were very good, distinguishing as they did between inductive and deductive arguments and covering the relevant ground with originality and flair. A number of them relying too much on lecture notes.

5. "Scientific theories are good if, and only if, their predictions are true." Discuss. (12)

Only a couple of essays distinguished between the necessary and sufficient condition to which the question refers. The rest tended to dump lots of information about Popper and Kuhn.

6. **Either** (a) Can we have knowledge of the future? (38)

Almost all of these essays covered the basics of the problem of induction fairly well. A few were excellent, picking up as they did on the subtle distinctions between the various proposed solutions. many of them relied too much on lecture notes.

Or (b) Do laws of nature tell us what must happen? (8)

These essays were mostly fine but relied a bit too much on lecture notes.

7. How should one choose between the Newtonian and the Leibnizian conceptions of space? (16)

These essays were in general excellent, insightful, thorough, and creative.

8. Critically evaluate the Platonist view of mathematics.(2)

Excellent essays on a difficult question, full of insight and creativity.

9. “The acceptance of a scientific theory is a social phenomenon, which cannot be explained without reference to social causes.” Discuss. (33)

Most of these essays relied too much on lecture notes. Many of them failed to discuss relevant material.

10. Is Darwin's argument for evolution by natural selection an instance of “inference to the best explanation”? (30)

These essays were in general good. The relevant material was covered and the arguments were on target. None sparkled particularly brightly. There was very little variation in the essays; maybe a bit too reliant on lecture notes.

11. Is the precautionary principle unscientific? (5)

These essay were fine, though nothing too exciting.

12. Is it wrong to undertake biomedical research on humans without their consent? (17)

A number of these essays were very good, going well beyond lecture notes and bringing together both the history and philosophy of medicine.