

NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Wednesday 27 May 1.30pm to 4.30pm

Paper 1

Ancients and Moderns

*You should answer four questions in total. Answer **one** question from Section A and **three** questions from Section B. All questions carry equal weighting.*

Begin each answer on a separate sheet.

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Answers must be tied up in separate bundles, marked 1, 2, 3, etc. according to the number of the question.

*Attach a completed coversheet to each bundle and complete a master coversheet listing all questions attempted. It is essential that you write your examination number and **not** your name on the coversheet and on **each** bundle.*

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Paper 1: Ancients and Moderns

SECTION A

1. Do you think that medieval science and the Scientific Revolution were made by their historians at least as much as they were found?
2. What were the social contexts of mathematics and the sciences before 1650?
3. Discuss the role of books in the history of science prior to 1650.

SECTION B

4. How important was the creation of new knowledge to ancient Greeks and Romans interested in understanding the natural world?
5. Did the traditional gods have any place in ancient Greek and Roman explanations of nature?
6. Why were many different textual formats used by Greco-Roman authors writing on mathematical and natural philosophical subjects?
7. "Observation was the most important function of instruments in medieval Europe." Discuss.
8. What was the relationship between books and instruments for a medieval astronomer?
9. "Medieval commentaries tend to be tedious, rarely adding to our understanding of Aristotle's own work." Discuss.
10. Identify three key ways in which nature became important in early modern European society.
11. To what extent did artistic products approximate nature in early modern Europe?

END OF PAPER

NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Monday 1 June

9.00am to 12.00pm

Paper 2

Early Medicine

*Students taking **History and Philosophy of Science** should answer **FOUR** questions. Answer **one** question from Section A and **three** questions from Section B. All questions carry equal weighting.*

*Students taking **Biological and Biomedical Sciences** should answer **THREE** questions, all of them chosen from Section B. Do not answer any questions from Section A.*

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Paper 2: Early Medicine

SECTION A

1. What opportunities do we have to appreciate the patient's view of illness before 1750?
2. Was there a relationship between understandings of health and understandings of disease between 1100 and 1750?
3. What defined a medical practitioner in medieval and early modern Europe? Did this change across the period?

SECTION B

4. Was women's medicine a woman's business during the Middle Ages?
5. Was the medieval hospital a place of care or of cure?
6. "Medieval scholastic medicine was dogmatic, repetitive and uncritical of the authority of ancient authors." Discuss this statement.
7. Did the discovery of the Americas change medicine in early modern Europe?
8. Discuss the relationship between epidemic disease and the control of urban space in early modern Europe.
9. Were efforts to prolong life compatible with the possibility of a good death in early modern Europe?
10. Was the home the principal site of medical practice in the early modern period?
11. Was early modern contractual medicine better for patients or for practitioners?

END OF PAPER

NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Friday 29 May

9.00am to 12.00pm

Paper 3

Sciences in Transition: Renaissance to Enlightenment

*You should answer four questions in total. Answer **one** question from Section A and **three** questions from Section B. All questions carry equal weighting.*

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Paper 3: Sciences in Transition: Renaissance to Enlightenment

SECTION A

1. What does “Renaissance to Enlightenment” mean in the history of science?
2. Was the scientific revolution the victory of rationality over religiosity?
3. In what ways can technology be said to have transformed natural knowledge between 1500 and 1800?

SECTION B

4. What, if anything, was new about discovery in early modern natural knowledge?
5. Why did early modern natural philosophers study the occult?
6. What did early modern natural philosophers mean when they referred to the book of nature?
7. How did laboratories become sites of experimental philosophy?
8. Discuss this statement:
“A different challenge to religion arose with Isaac Newton. His theories of motion and gravitation showed how natural phenomena could be explained without divine intervention.” (Steven Weinberg, *Times Literary Supplement*, 2007)
9. Was Michel Foucault right to present the eighteenth century as an age of description and ordering of nature?
10. Which was more important for the practice of eighteenth-century natural history: wealth or politeness?
11. To what extent was natural history revolutionized by travel?

END OF PAPER

NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Saturday 30 May 9.00am to 12.00pm

Paper 4

Science, Industry and Empire

*You should answer four questions in total. Answer **one** question from Section A and **three** questions from Section B. All questions carry equal weighting.*

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Paper 4: Science, Industry and Empire

SECTION A

1. Evolutionary arguments became important in a wide range of disciplines in the late nineteenth century. Did they help unify the sciences?
2. To what extent was physics the queen of the sciences in the nineteenth century?
3. Despite much criticism, the idea of a warfare between science and religion in the nineteenth century continues to be widely supported. Why is this the case, and what evidence can be used to support the existence of a conflict in this period?

SECTION B

4. "In the nineteenth century German science was the same as English science, just with added universities." Discuss.
5. To what extent was the establishment of distinct fields of experimental science dependent upon public utility?
6. In what ways were botany, geology and/or anthropology important in developing Britain's network of empire and free trade?
7. How, if at all, did science become a profession in nineteenth-century Britain?
8. What does Hermann Helmholtz's career reveal about the changing nature of physics and physiology in the nineteenth century?
9. What were the politics of evolution in Britain before 1859?
10. Why was Paris considered to be the centre of the scientific world in the early decades of the nineteenth century?
11. Why did many contemporaries believe that Alexander von Humboldt was the greatest naturalist of the age?

END OF PAPER

NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Monday 1 June

1.30pm to 4.30pm

Paper 5

Modern Medicine and Biomedical Sciences

*Students taking **History and Philosophy of Science** should answer **FOUR** questions. Answer **one** question from Section A and **three** questions from Section B. All questions carry equal weighting.*

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Paper 5: Modern Medicine and Biomedical Sciences

SECTION A

1. "Medical theories may have changed, but experiences of health and illness have remained much the same." Does the history of modern medicine support this claim?
2. "We shall not discuss to what extent medicine deserves to be called a 'science,' for it is certain that, however scientific it be or may become, it is also and will always remain an 'art'" (George Sarton, 1935). Discuss with respect to the history of medicine since 1750.
3. How has gender shaped modern medicine?

SECTION B

4. "Hospitals changed more around 1900 than they did around 1800." Assess this claim.
5. What was "mutton medicine" and why did it threaten Edwin Chadwick's public health reforms?
6. "The germ theory of disease was probably the most important single concept for the history of modern medicine." Discuss.
7. Discuss the significance for the history of medical science of the chemical compound tested as "606" and marketed as the drug "Salvarsan."
8. Did World War II bring about a significant shift in the conduct of biomedical research?
9. Why and to what extent did debates over the use of human beings in medical experiments become part of a general critique of biomedicine?
10. "Population control is history" (Matthew Connelly, 2003). Discuss.
11. How and why have environmental health concerns changed since 1900?

END OF PAPER

NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Thursday 28 May 9.00am to 12.00pm

Paper 6

Metaphysics, Epistemology and the Sciences

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Paper 6: Metaphysics, Epistemology and the Sciences

SECTION A

1. Is there more to scientific knowledge than having empirical facts?
2. In what ways, if at all, is science disunified?
3. Should philosophy of science leave metaphysical ambitions behind?

SECTION B

4. Is the only thing that all good explanations have in common the feeling of understanding that they generate in the listener?
5. Are there any accounts that succeed in defining precisely the conditions under which one's evidence confirms a theory?
6. Is testimonial evidence on a par with evidence obtained through observation?
7. Are there essentially inarticulable aspects of scientific knowledge?
8. Are there any useful methodological rules to be followed by a scientist wishing to make a discovery?
9. How can the discussion of species as natural kinds inform debates about natural kinds outside biology?
10. Must a functional explanation appeal to selection?
11. Does science need laws? If so, what kind? If not, why not?

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NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Friday 29 May

9.00am to 12.00pm

Paper 7

Ethics and Politics of Science, Technology and Medicine

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Paper 7: Ethics and Politics of Science, Technology and Medicine

SECTION A

1. Are there “two cultures,” and why does this matter?
2. Is there a difference between the politics of science and the politics of technology?
3. Which kinds of value-freedom in science are valuable?

SECTION B

4. Are scientific experiments ever replicated?
5. How and why did the Society for Freedom in Science and J. D. Bernal and his socialist associates form different views on the proper relations between science and society?
6. “Scientists face problems of inductive risk; therefore, their work must be value-laden.” Discuss.
7. Should science make assumptions about well-being? If so, which ones? If not, why not?
8. What are the moral implications for individuals with disabilities of the increasing use of reproductive technologies?
9. Are genetically modified organisms “natural”? Why does this matter?
10. When the law isn’t made by experts, why does expert testimony matter?
11. What is “high modernism” and how does this idea help us to understand the relationship between technology and politics?

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NST2HP

Natural Sciences Tripos Part II: History and Philosophy of Science

Wednesday 27 May 9.00am to 12.00pm

Paper 8

History and Philosophy of the Physical Sciences

*You should answer four questions in total. Answer **one** question from Section A and **three** questions from Section B. All questions carry equal weighting.*

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Paper 8: History and Philosophy of the Physical Sciences

SECTION A

1. Is physics more fundamental than other sciences?
2. Using examples, discuss how measurement has contributed to the development of the physical sciences.
3. Has the progress of the physical sciences from the eighteenth century to the present provided decisive grounds for scientific realism?

SECTION B

4. Has chemistry been reduced to physics? Discuss with reference to the development of atomic chemistry or quantum chemistry.
5. How did changes in instrumentation change the character of astronomy?
6. Did the emergence of modern physics depend as much on machines as on metaphysics? Or was some other factor as important?
7. Explain the importance of imponderable substances (including caloric, phlogiston and electricity) in chemistry in the decades around 1800.
8. Evaluate the significance of empirical evidence for the properties of atoms and molecules postulated by chemical and physical theories in the nineteenth century.
9. Can the experimenter's regress be avoided through calibration? Discuss using specific examples.
10. Einstein, Podolsky and Rosen's famous paper asks whether quantum theory can be considered complete. What does the question mean, and what arguments are relevant to the answer?
11. Describe a thought experiment involving a clock based on reflected light beams, which shows the time dilation and length contraction effects in special relativity. Is this an absolute or a frame-dependent effect?

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Natural Sciences Tripos Part II: History and Philosophy of Science

Wednesday 27 May 9.00am to 12.00pm

Paper 10

Human and Behavioural Sciences

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Paper 10: Human and Behavioural Sciences

SECTION A

1. "Psychology can never truly be scientific." Discuss.
2. How, if at all, have the social sciences drawn on the natural sciences?
3. When, if at all, is reduction to a more fundamental level desirable?

SECTION B

4. Why did brands of psychological experimentation other than physiological psychology not succeed?
5. How have anthropologists sought to understand social action?
6. Folk psychology should be eliminated from any science. Do you agree?
7. Should we be dualists?
8. Can corporate agents act?
9. Does social science have laws? If yes, what are they? If not, does it need them?
10. What is the point of rational choice modelling?
11. In what senses has anthropology provided a mirror to Western conceptions of self and society?

END OF PAPER

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Natural Sciences Tripos Part II: History and Philosophy of Science

Thursday 28 May 9.00am to 12.00pm

Paper 11

Science and Technology Since 1900

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Paper 11: Science and Technology Since 1900

SECTION A

1. “The history of science in the twentieth century divides neatly in two, with 1945 as the crucial turning point.” Assess this claim.
2. “[S]ince health, well-being, and security are proper concerns of Government, scientific progress is, and must be, of vital interest to Government. Without scientific progress the national health would deteriorate; without scientific progress we could not hope for improvement in our standard of living or for an increased number of jobs for our citizens; and without scientific progress we could not have maintained our liberties against tyranny.” (Vannevar Bush, 1945). How important was the idea that scientific progress is “of vital interest to Government” to the development of science and technology in the twentieth century?
3. Is the definition of science as “what scientists do” a good definition for science in the twentieth century?

SECTION B

4. The events of the early twentieth century show that science was only ever international by repute. Discuss.
5. Have the social forms of scientific life shaped biological life forms since 1914?
6. What can we learn from the history of ecology and environmentalism about the engagement of scientists with politics?
7. Did the uses of scientific expertise by (U.S.) Americans and Europeans in Africa, Asia, and Latin America change significantly between 1900 and 1980?
8. Leaving office in 1961, Dwight Eisenhower famously drew attention to what he described as both a technological revolution and a revolution in the conduct of scientific research. Why was he concerned about the power of scientific-technical elites, and would the subsequent history of the sciences have allayed his fears or confirmed them?
9. Was there a distinctive “Cold War science”?
10. How and to what extent did evolutionism change over the course of the twentieth century?
11. Should we focus on the origins of new machines in telling the history of computing?

END OF PAPER