NST2HP
Natural Sciences Tripos Part II: History and Philosophy of Science

Paper 1: Early Science and Medicine

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

You should spend no more than three hours on answering all the questions, and a word limit is set of no more than 1,500 words per answer.

All your answers for this paper should be submitted in one DOC, DOCX or PDF document. Each answer should be clearly headed with the question number and the question.

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SECTION A

1. In 1620, Francis Bacon listed printing, gunpowder, and the magnet as recent inventions that had changed the face of the Earth. Discuss the relevance of these inventions for the development of scientific knowledge in the early modern period.

2. Describe the impact of processes of translation between European and non-European languages on early science and medicine.

3. How did colonization shape the development of science and medicine in the early modern period?

SECTION B

4. What made poetry an effective medium for communicating scientific ideas in antiquity?

5. Discuss the relationship between the home as a space of healing and the “medical marketplace”.

6. How did early modern people differentiate between kinds of human bodies?

7. Describe the significance of state patronage to the production and exchange of scientific knowledge in premodern Asia.

8. “Newton is at number one, because almost out of nothing, out of an era of witchcraft and sorcery, he comes up with the mathematics of the universe. That’s incredible” (Michio Kaku interviewed in *The Observer*, 2021). Is it incredible?

9. What was the role of ships in the development of early modern science?

10. Why were local contexts so important in the long-distance drugs trade during the early modern period?

11. How did philosophical theories and religious practices shape pre-modern concepts of the body in Chinese and Islamic societies?

12. In what ways did visual cultures shape medicine in the early modern period?

END OF PAPER

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Paper 2: Sciences and Empires

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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SECTION A

1. Theodore Porter claims in *Trust in Numbers* (1995) that accounting in the context of state bureaucracy and commerce contributed to quantification and measurement in the natural sciences. How does this statement help us to understand the history of the modern sciences?

2. "Scientific knowledge is made in a lot of different places. Does it matter where? Can the location of scientific endeavor make any difference to the conduct of science? And even more important, can it affect the content of science?" (David Livingstone, 2003). How would you answer these questions?

3. Did the end of empires fundamentally disrupt imperial regimes for managing nature and natural resources?

SECTION B

4. According to James Secord, a "Darwin-centered account" of nineteenth-century changes in understandings of the natural world "is no longer credible" *(Victorian Sensation*, 2000*).* Discuss alternative accounts and evaluate their merits.

5. In 1885, Agnes Mary Clerke argued that the advent of astrophysics had made astronomy “more popular, both in its needs and in its nature”. What evidence can you give to support or refute this claim?

6. How did the status and position of the “embodied observer” in physics change between the 1860s and 1920s?

7. Why was it important for Newell, Shaw and Simon to emphasize “we are not using the computer as a crude analogy to human behavior” in 1958?

8. “The history of petrochemical science and technology is as much a history of producing ignorance as it is a history of producing knowledge.” Do you agree?

9. Does the history of other natural resources support the characterisation of data as a “resource” to be “mined”? Where does the history of data as a resource converge or diverge with that of things like water, oil, and genes?

10. How did the translation of texts shape the history of science in China’s Qing dynasty?

11. What impact did the collapse of the Japanese empire after the Second World War have on the history of science in East Asia?

12. What roles have conceptions of science played in the development of anthropology?

END OF PAPER

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Paper 3: Modern Medicine and Life 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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SECTION A

1. How and to what extent were medicine and the life sciences "internationalised" in the twentieth century?

2. Did industrialisation make people healthier?

3. Did the rise of experimental biology make biological collections obsolete? Why or why not?

SECTION B

4. "In the nineteenth century arguments about the constitution of medical knowledge were arguments about the organization of society." Explain this statement.

5. To what extent, and with what consequences, had diseases come to be regarded as "specific processes defined by laboratory work" (Christopher Lawrence, 2006) by the early twentieth century?

6. Who might have voiced opposition to changes in the management of hospitals in the first half of the twentieth century and why?

7. Assess the roles of state and industrial actors in bringing new pharmaceuticals to the market since around 1900.

8. How, and with what consequences, did new social movements challenge the authority of medicine after World War II?

9. Who gained and who lost by the introduction of farming practices with potentially harmful consequences for health?

10. Which social, economic and political factors motivated the eugenics movement around 1900?

11. Has the so-called Modern Synthesis in evolutionary biology resulted in new understandings of race and racism after World War II?

12. Should we consider post-World War II molecular biology and/or ecology as having been “nuclear sciences”?

END OF PAPER

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Natural Sciences Tripos Part II: History and Philosophy of Science

Paper 4: Philosophy and Scientific Practice

Also Paper HPS4 in PBT2 Psychological and Behavioural Sciences Tripos Part II

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SECTION A

1. Can philosophy of science contribute to scientific practice? If so, how?

2. What would you change about medical research to make it better?

3. All sciences make compromises between different values. Discuss.

SECTION B

4. What is the biggest problem for the selected effects account of biological function? Can it be overcome?

5. Is there a compelling argument for the anti-psychiatry position?

6. How should the medical research agenda be set?

7. What, if anything, can be done to overcome anthropomorphic bias in cognitive science?

8. What, if anything, makes rational choice modelling essential to economics?

9. What conception of welfare should economics adopt?

10. Physics does not need to answer metaphysical questions. Discuss.

11. What constraints, if any, does the special theory of relativity place on our understanding of time?

12. What is the strongest criticism of the idea of neurodiversity, and is it convincing?

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Natural Sciences Tripos Part II: History and Philosophy of Science

Paper 5: Epistemology and Metaphysics of Science

Also Paper HPS5 in HPT3 Human, Social and Political Sciences Tripos Part IIB and Paper 6 in PHT1 Philosophy Tripos Part IB

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SECTION A

1. Has science been successful in obtaining objective truth?

2. Is there any sense in which good scientific knowledge may not be built on experience?

3. What are the most important aims of science?

SECTION B

4. What role, if any, does understanding play in scientific practice?

5. What is the best way for realists to respond to the pessimistic induction?

6. Can human knowledge ever be free from perspectival limitations?

7. Are laws of nature mind-independent facts of regular association between properties?

8. What is the so-called “problem of old evidence”? Discuss one possible resolution of the problem.

9. What is the most successful case of inter-field reduction (biology to chemistry, chemistry to physics, etc.) that you are aware of? How successful is that case?

10. Can science be genuinely explanatory without invoking causes?

11. Should scientific models accurately represent their intended targets?

12. Did the pragmatists have anything new and productive to say about the concept of truth?

END OF PAPER

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Paper 6: Ethics and Politics of Science, Technology and Medicine

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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SECTION A

1. Can bad people do good science?

2. What role can (or should) history and philosophy of science play in controversial sciences?

3. Can science, technology and medicine answer social problems?

SECTION B

4. Must a sociology of scientific knowledge be relativist?

5. How and why did the relationship between science and activism change between the 1920s and the 2020s?

6. In China under Mao, how, if at all, did science “serve the people”?

7. What is the black box problem in artificial intelligence? Can it be solved?

8. “Although the perception of the personal and social relationships created by egg or embryo reconstruction would be essentially a matter for the individuals

concerned, it is the view of the Working Group that mitochondrial donation does not indicate, either biologically or legally, any notion of the child having either a ‘third parent’, or ‘second mother’.” (Nuffield Council on Bioethics) Is the Working Group’s view a sensible one?

9. “If you consent to being screened for cancer, then you can’t complain if you are overtreated for cancer.” Does that make sense?

10. Does the argument from inductive risk show that science cannot be objective?

11. How have the colonial origins of much climate data shaped the development of the climate sciences?

12. Why does anyone trust the results of scientific experiments?

END OF PAPER