

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

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Monday 4 June 2018      09.00–12.00

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## **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.*

*Begin each answer on a separate sheet.*

*Write legibly and on only **one** side of the paper.*

*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.*

**You may not start to read the questions printed on the subsequent pages of this question paper until instructed to do so by the invigilator.**

## SECTION A

1. What can the study of early instruments reveal about scientific and medical practices?
2. How did contact across cultures shape the development of medicine and natural knowledge before 1600?
3. Discuss the major sites for the practice of medicine in the medieval and early modern periods.

## SECTION B

4. Early natural philosophers and mathematicians presented their work in a variety of types of texts. Why?
5. Historians have sometimes claimed that one of the most significant differences between Ancient and medieval scientific explanations and those of later periods is the reliance on empirical (including experimental) evidence. Discuss, with reference to at least three different sources.
6. How and why did medieval and early modern medical authors look to Ancient sources?
7. Why did anatomy become so important in the sixteenth and seventeenth centuries?
8. Discuss the importance of astrology in medical prognosis in the medieval and early modern periods.
9. Discuss the relationship between state borders and disease in the early modern period.
10. Why did early modern physicians criticise other kinds of healers?
11. "Medicine from below". What does this perspective bring to the history of medieval and early modern medical encounters?
12. "A time of profound transformation in the science of sexuality" (Londa Schiebinger, 1993). How apt is this description of the early modern period?
13. How did the Black Death change medical practices?
14. When would an early modern physician advise his patient and the patient's family to call a priest?

15. How might a scholar writing in 1600 describe the difference between a man's and a woman's body?

**END OF PAPER**

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Tuesday 5 June 2018      09.00–12.00

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## **Paper 2**

### **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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## SECTION A

1. What was the role of experiment in early modern sciences?
2. How did audiences matter for early modern natural knowledge?
3. Is magic significant for the history of science?

## SECTION B

4. What was the difference between astrology and astronomy in early modern Europe?
5. How did the authority of nature change in early modern Europe?
6. What was the role of religious institutions in shaping early modern natural knowledge?
7. Why did natural philosophers study alchemy?
8. What was the early modern European view of natural history's contribution to the wealth of nations?
9. How did printed books affect the development of early modern scientific culture?
10. What kinds of social change did practical application of natural philosophical knowledge in the seventeenth and eighteenth centuries achieve?
11. Who contributed and how to global exchanges of knowledge in the early modern period?
12. What was the importance of classification in Enlightenment natural history?
13. Why was comparative anatomy so central to the way natural history was transformed in the late eighteenth century?
14. Was Isaac Newton an Enlightenment scientist?
15. How did European astronomy change during the eighteenth century?

**END OF PAPER**

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Wednesday 6 June 2018 09.00–12.00

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### **Paper 3**

#### **Science, Medicine 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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## SECTION A

1. What roles did empire and global trade play in the emergence and character of field sciences such as geology, botany, epidemiology and anthropology?
2. "It mattered little whether nineteenth-century researchers were based in laboratories, hospitals, observatories, museums, surveys or any other kind of institution. What made the difference was the country where they worked." Discuss.
3. Discuss professionalisation as it relates to both medicine and science during the nineteenth century.

## SECTION B

4. You have been commissioned to write a book entitled *A History of Medicine in Ten Objects*. Select three objects from the period between 1780 and 1914 and justify your choices.
5. How have sites of anthropology changed over time?
6. "The science of calculation becomes continually more necessary at each step of our progress, and must ultimately govern the whole of the application of science to the arts of life" (Charles Babbage, 1832). Did the development of the sciences in the nineteenth century confirm Babbage's prophecy?
7. "Laboratory researchers did not set themselves up in opposition to hospital doctors in the nineteenth century, but rather learned from and worked in harmony with them." Assess this claim.
8. To what extent was the theory of evolution by natural selection a product of Britain's informal empire of commerce and trade?
9. Were physical standards a prerequisite for scientific internationalism?
10. "Depiction may have mattered increasingly in medical science through the nineteenth century, but by its end, description still mattered more." Discuss.
11. What were the aims of the *Beagle* when it left Plymouth harbour in December 1831?
12. Was the category of "race" biologized in the nineteenth century? Use examples to support your view.

13. Is “Humboldtian science” just another way of talking about “imperial science”?
14. How did nineteenth-century bacteriologists respond to their critics, and to what effect?
15. Discuss the role of sciences in shaping conceptions of the future during the nineteenth century.

**END OF PAPER**

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Tuesday 12 June 2018 09.00–12.00

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**Paper 4**

**Science, Medicine and Technology since 1900**

*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. In what ways, and to what extent, did military demands drive scientific and medical development in the twentieth century?
2. “We should understand the twentieth century as a coherent epoch in the history of science.” Assess this claim.
3. In what ways did patrons and funders influence scientific, technological and medical research in the twentieth century?

## SECTION B

4. “The early twentieth-century medical elite rejected laboratory science.” Assess this claim.
5. “‘Pure science’ does not exist, but ‘pure science’ is still an influential historical category.” Assess this claim.
6. What can the histories of relativity and the atomic bomb tell us about the relations between science and politics in the early twentieth century?
7. Compare the contributions of big physics and small physics to American society.
8. Why, and with what consequences, were the reproductive sciences considered “illegitimate” in the twentieth century? To what extent did that change?
9. How did Bukharin and other Soviet thinkers criticise Western understandings of science?
10. Discuss the role of patents in the development of biotechnology.
11. “The experimental approach to the challenge of disease assures us that the Golden Age of Medicine we now enjoy will extend far into the future” (President of the New York Academy of Sciences, 1956). Discuss the significance of such claims for the history of twentieth-century medicine.
12. How did medical and scientific research in early twentieth-century Africa reflect and/or subvert imperial projects?
13. Why did health policymakers advocate for “health for all” in the 1970s?
14. Compare the trajectories of biology and physics through the second half of the twentieth century.

15. How, between 1918 and 1945, were new medicines brought to market and what roles did academic researchers, pharmaceutical companies, clinicians and governments play?

**END OF PAPER**

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Thursday 7 June 2018      09.00–12.00

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## **Paper 5**

### **Philosophy of Science**

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## SECTION A

1. Do metaphysical commitments matter to scientific research?
2. Do models make a difference to the issue of scientific realism?
3. Is the unity of science a good ideal?

## SECTION B

4. Compare the relative merits of the No Miracles Argument and the Pessimistic Meta-Induction in the debate on scientific realism.
5. What, if anything, is the problem with relying on evidence from animal experiments to make inferences about the effectiveness of medical interventions in humans?
6. Is the Bayesian model of scientific inference superior to the frequentist model of scientific inference?
7. Is randomised controlled trial the gold standard of causal inference?
8. "Similarity is neither necessary nor sufficient for scientific representation." Discuss.
9. "Any theory in the special sciences is ultimately reducible to a theory in physics." Do you agree?
10. Do laws govern phenomena?
11. How, if at all, can idealised models enable learning true facts about phenomena?
12. Discuss the roles of falsification and confirmation by induction in scientific reasoning.
13. Does deriving a fact from a law explain this fact?
14. What does modern physics teach us about causation?
15. How, if at all, has modern physics updated our concept of time?

**END OF PAPER**

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Monday 11 June 2018      09.00–12.00

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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. How, if at all, could you write a social history of truth?
2. When science starts relying on value judgments, it stops being science. Discuss.
3. Should scientists care about society?

## SECTION B

4. "We look with our eyes, but we see with the eyes of the collective body: during each single observation, we have the joint action of the entire store of the knowledge of the collective body, and its customs" (Ludwik Fleck). Discuss.
5. Does the experimenter's regress matter to the work of the sciences?
6. What are rational choice models good for?
7. Is cost-benefit analysis the right approach to decision making?
8. There is more to the good life than preference satisfaction. Discuss.
9. How did dialectical materialism shape the organisation of scientific research in the Soviet Union?
10. Is the argument from inductive risk compelling?
11. Informed consent is important in both research and treatment contexts, but is it important for the same reasons?
12. Does maximisation of Quality Adjusted Life Years discriminate? If so, is this a problem?
13. Should doctors kill terminally ill patients?
14. What are the conditions, if any, under which scientific research can achieve objectivity?
15. Can one consistently be pro-choice and a vegetarian?

**END OF PAPER**