

# NATURAL SCIENCES TRIPOS PART IB

## NATURAL SCIENCES TRIPOS PART II (General)

---

Wednesday 2nd June 1999

9 to 12

---

### HISTORY AND PHILOSOPHY OF SCIENCE (1)

History of Science

Answer *question one* from *Section A* and *three* questions chosen from *Section B*

#### SECTION A

- 1 Is the history of science the history of great men?

#### SECTION B

- 2 'Astrology was what made astronomy into a "physical" science.' Discuss.
- 3 'The mechanical philosophy of the seventeenth century had as many important critics as it had supporters.' Do you agree?
- 4 **Either** (a) What, if anything, was "the Newtonian synthesis"?  
**Or** (b) Eighteenth-century natural philosophers were just filling in the blanks left by Newton. Do you agree?
- 5 How did the institutions that supported natural knowledge change between 1600 and 1750?
- 6 'Anton Mesmer was a serious practitioner of natural philosophy and "animal magnetism" was a reasonable theory by the standards of the 1780s.' Discuss.
- 7 The period from 1790 to 1830 is often identified as a time of major transformation in the physical, life and medical sciences. What changed, and why?
- 8 **Either** (a) What led Darwin to the principle of evolution by natural selection? How was his theory different from earlier theories of organic evolution?  
**Or** (b) 'Darwin + Mendel = The Modern Evolutionary Synthesis.' Do you agree?

- 9 By the end of the nineteenth century, European governments were paying large numbers of scientists to do research in laboratories. How and why did this come about?
- 10 How did Freud construct a science out of the private lives of the Viennese bourgeoisie?
- 11 **Either** (a) Einstein's answer in 1905 was 'special relativity'. What had been the questions?  
**Or** (b) The word 'statistics' originated in the word 'state'. What is the historical significance of this?
- 12 **Either** (a) In what way was the Manhattan Project important for the development of the sciences during and after World War II?  
**Or** (b) 'Life is basically an affair of molecules.' (G.W. GRAY, Scientific American, 1951)  
Does the history of the biomedical sciences in the twentieth century support this view?

END OF PAPER

# NATURAL SCIENCES TRIPOS PART IB

## NATURAL SCIENCES TRIPOS PART II (General)

---

Thursday 3rd June 1999

9 to 12

---

### HISTORY AND PHILOSOPHY OF SCIENCE (2)

Philosophy of Science

*Answer **question one** from **Section A** and **three questions** chosen from **Section B***

#### SECTION A

- 1 'Historians of science describe how scientists actually behave, which is not much use to philosophers of science, who are trying to determine how scientists ought to behave.' Discuss.

#### SECTION B

- 2 **Either** (a) Does Descartes succeed in showing that knowledge cannot depend exclusively on the senses?  
**Or** (b) 'Induction is rational if nature is regular.' Discuss.
- 3 **Either** (a) Is it possible to imagine something existing unperceived? How does the answer bear on idealism?  
**Or** (b) In what sense, if any, are shapes more objective than colours?
- 4 **Either** (a) What is the difference between causation and correlation?  
**Or** (b) What is the connection between explanation and prediction?
- 5 **Either** (a) 'Names may just be labels, but if Kripke were right we would seldom know to whom they are attached.' Discuss.  
**Or** (b) Do laws of nature describe how things must behave?
- 6 What is the difference between data that support a theory and data that are irrelevant to it?
- 7 'Both Popper and Kuhn believe that all scientific theories have a use-by date, after which they are thrown away. Given their agreement on this silly position, the differences between them are insignificant.' Discuss.

- 8 'Physical theories are just mathematical models we construct, and it is meaningless to ask if they correspond to reality, just whether they predict observations' (STEPHEN HAWKING). Discuss.
- 9 **Either** (a) Critically analyze Shapin's sociological analysis of phrenology in early nineteenth-century Edinburgh.  
**Or** (b) What is tacit knowledge? Why is it important in the sciences?
- 10 Is epistemological relativism a tenable position?
- 11 **Either** (a) What are the implications of the special theory of relativity for absolute conceptions of space and time?  
**Or** (b) Explain the structure and significance of the 'paradox' of Schrödinger's cat.
- 12 How should moral responsibility for genetic engineering and reproductive technology be divided between scientists and other members of society?

END OF PAPER