

HISTORY AND PHILOSOPHY OF SCIENCE (1)

Classical traditions in the sciences

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

SECTION A

- 1 Was there such a thing as 'science' in the pre-modern period?
- 2 Who were the people who were concerned with scientific work in the pre-modern period? In what sites and places did they engage in such work?
- 3 'In the pre-modern period there is more philosophy of science than science.' Discuss.

SECTION B

- 4 **Either** (a) How far is it possible for us to penetrate the smoke screen of Aristotle's interpretation of his predecessors' thought? You may limit your answer, if you wish, to his reports on earlier views on the position of the earth.
Or (b) How do the ideas in Aristotle's Posterior Analytics relate to his own investigations into animals?
- 5 **Either** (a) 'Any attempt at a general characterisation of "Hippocratic" medicine is doomed to failure.' Discuss.
Or (b) Discuss the interactions between 'medicine' and 'philosophy' in either the Hellenistic period or in Galen.
- 6 **Either** (a) Why did Plato elaborate a cosmology? How does his cosmology relate to his more general metaphysical and epistemological positions?
Or (b) What were Ptolemy's aims in his astronomy? Were they typical of Greek investigations in this field?
- 7 **Either** (a) Compare and contrast the relationship between religion and the study of nature in Arabic and Western European societies in the Middle Ages.
Or (b) Was there such a thing as 'Medieval' Science?
- 8 **Either** (a) What were the 'seven arts' and the 'three philosophies'? What part did they play in medieval education?
Or (b) What parties had an interest in the teaching of natural philosophy in the middle ages? What did they hope to get out of it? Was medieval natural philosophy of any use?
- 9 How and why was natural philosophy transformed during the decades around 1500?

- 10 **Either** (a) How and why did the role of mathematicians and cartographers change between 1450 and 1600?
Or (b) Discuss the effect of New World discoveries on European studies of nature.
- 11 Was there a difference between Catholic and Protestant churchmen in the way they understood and promoted studies of nature?
- 12 **Either** (a) 'Readers are never confronted with abstract or ideal texts detached from all materiality; they manipulate or perceive objects and forms whose structures and modalities govern their reading and thus the possible comprehension of the text read.' Discuss how a focus on the materiality of books can change our reconstruction of early modern natural philosophy.
Or (b) What objects dating from the period prior to 1600 should be described as 'scientific instruments'? How were such 'scientific instruments' used?
- 13 **Either** (a) 'The astronomical revolution, not only as regards its origins but also as regards its development was almost entirely independent of the development of observational astronomy' (Koyré). Discuss.
Or (b) What was the so-called method of exhaustion, and why was it so important in mathematics down to the 17th century?

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HISTORY AND PHILOSOPHY OF SCIENCE (2)

Natural and moral philosophies

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

SECTION A

- 1 'By 1800, natural philosophy and natural history had freed themselves from religion, philosophy and politics and thus became physical and life sciences as we know them.' Discuss.
- 2 In what 'sites' did Enlightenment philosophy, natural philosophy and natural history take place?
- 3 What sorts of persons were involved in the pursuit of learning in the 17th and 18th centuries?

SECTION B

- 4 **Either** (a) 'In the 17th and 18th centuries, natural philosophy became "public" and part of popular culture.' Discuss and assess the implications of this.
Or (b) 'The mechanization of nature and natural philosophy in Europe from 1600 to 1800 meant many different things.' Discuss this range of meanings and decide if there is one central meaning to 'mechanization'.
- 5 In the 18th century, were the approach of measuring forces and that of inventing fluids rival and exclusive models for natural philosophy, or did they eventually become reconciled and combined?
- 6 Dr. Johnson thought that kicking a stone was enough to refute Berkeley's immaterialism. Was he right?
- 7 **Either** (a) How does Locke support his view that the human mind is like an empty cabinet?
Or (b) Assess Hume's claim that all our ideas make their first appearance to the mind as impressions.
- 8 'Linnaeus and Cuvier were not reformers of natural history, but rather creators of new disciplines.' Discuss.
- 9 **Either** (a) What was at stake in eighteenth-century debates over systems of classification of living beings?
Or (b) 'Natural history in eighteenth-century Europe was primarily a practice of collection and display.' Comment.

- 10 **Either** (a) In 1726, Richard Glynne advertised that he 'Makes and sells apparatus for experimental philosophy'. In 1747, Joseph Hickman introduced the term 'Philosophical Instrument Maker'. What is the significance of the term 'philosophical instrument'?
- Or** (b) 'The compound microscope had been invented in about 1600 but had excited much less general enthusiasm than its contemporary, the telescope. Reasons for this apparent lack of interest are complex: The telescope gave detail to an already accepted world-view, providing evidence for Copernican ideas, but the microscope fitted into no similar conceptual framework. The heavenly bodies could be seen with the naked eye, and the telescope simply clarified the image; that there was anything worth looking at in the invisible microscopic world was inconceivable.' Discuss.
- 11 **Either** (a) Flamsteed believed that the French observatory was inferior to the English one. Was he right? How important was the foundation of observatories for the development of astronomy in the 17th and 18th centuries?
- Or** (b) Within early modern scientific institutions, what was the relationship between specific practical projects and more general research?
- 12 How different was the University of Göttingen from Cambridge University in the 18th century?
- 13 'We may well ask, What causes induce us to believe in the existence of body? But 'tis in vain to ask, Whether there are bodies or not? That is a point, which we must take for granted in all our reasonings' (HUME, Treatise of human nature). Discuss.
- 14 **Either** (a) What does Kant mean by experience? Did experience in Kant's sense make it possible to achieve a complete science of nature?
- Or** (b) 'The objective validity of the categories as a priori concepts rests on the fact that, so far as the form of thought is concerned, through them alone does experience become possible' (KANT, Critique of pure reason). Discuss.

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HISTORY AND PHILOSOPHY OF SCIENCE (3)

Science, industry and empire

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

SECTION A

- 1 'Savant', 'Natural philosopher', 'Man of Science', 'Naturphilosoph' and 'Scientist' were only a few of the terms used to characterize those engaged in the enquiry into nature during the period between the French Revolution and the First World War. Were differences between such terms significant, and if so, why?
- 2 How, if at all, did the natural sciences contribute to a 'crisis of faith' in the nineteenth century?
- 3 Compare and contrast the private and public uses of scientific instruments during the Victorian period.

SECTION B

- 4 In early nineteenth-century Britain, what was 'useful knowledge' useful for?
- 5 **Either** (a) Compare the reception of the *Vestiges of the Natural History of Creation* (1844) with that of the *Origin of Species* (1859). How do you explain the differences?
Or (b) 'There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.' (C. DARWIN, 1859). Why did Darwin choose to end the *Origin of Species* with this sentence?
- 6 To what extent was the expansion of reading audiences in nineteenth-century Britain the outcome of a revolution in technology?
- 7 'Science is cosmopolitan. Electricity abolishes time and envelops both hemispheres with a new idea as soon as it has emerged from the Thinker' (N. LOCKYER, 1901). Discuss, especially in the context of debates about scientific nationalism and internationalism in the final decades of the nineteenth century.
- 8 **Either** (a) Lewis Pyenson argues for a sharp distinction between the 'exact' and 'descriptive' sciences in terms of their involvement with the forces of imperialism. Is this a useful distinction?
Or (b) How were European ideas of what it meant to be a man of science shaped by imperial encounters during the nineteenth century?

- 9 **Either** (a) 'The German academic system 'conquered' the rest of Europe and the United States.' Discuss in relation to the sciences.
Or (b) Explain the terms "Wissenschaft" and "Bildung" and discuss their role in the formation of scientific disciplines in 19th century German Universities.
- 10 '[C]hemistry cannot wait [we must] free ourselves from the all too slowly moving [academic] institutions, and take the initiative in creating new functional forms to meet the needs of chemical science and technology.' (WILHELM OSTWALD, 1906). How and why did chemistry change in Germany between 1871 and 1918?
- 11 Why was the determination of standards so important in late nineteenth-century physics laboratories?
- 12 **Either** (a) 'The party and its representatives must reject not only the partial appropriation of Haeckelian thinking that is occasionally demanded, but any engagement at all of party offices with details of the researches and teaching of Haeckel.' (GUNTHER HECHT, Racial Political Office of the NSDAP, 1937). Critically assess the thesis that we should see in the Darwinism of Ernst Haeckel 'the scientific origins of National Socialism' (DANIEL GASMAN, 1971).
Or (b) 'Pathological science.' Is this, in your view, an appropriate description of science under German fascism?

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HISTORY AND PHILOSOPHY OF SCIENCE (4)

Metaphysics, epistemology, and the sciences

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

SECTION A

- 1 Can the philosophy of science help scientists improve their practice?
- 2 'The dispute between the scientific realists and their opponents is like the dispute between the religious and the atheists.' Discuss.
- 3 Should one be more impressed by the similarities or by the differences between scientific and everyday inquiry?

SECTION B

- 4 **Either** (a) What was the disagreement between Whewell and Mill over induction? Who was right?
Or (b) Was Karl Popper the real father of the hypothetico-deductive model of science?
- 5 **Either** (a) Did Duhem show that scientists can never know whether any of their theories are true or false?
Or (b) How if at all does the predictive success of science bear on the question of whether we should believe that our best scientific theories are true or only empirically adequate?
- 6 **Either** (a) How is it possible to refer to entities we do not observe?
Or (b) What is incommensurability? What difference does it make?
- 7 **Either** (a) Can Bayesianism solve the problem of induction?
Or (b) Does reliabilism vindicate the inductive justification of induction?
- 8 Does most testimony have to be true?
- 9 **Either** (a) Is the trust one scientist places in another moral or prudential?
Or (b) Is truth, rather than agreement or utility, the basis of social epistemology?
- 10 **Either** (a) Is there any analysis of causation that can properly handle cases of common cause or of pre-emption?
Or (b) Assess the 'best system' account of laws of nature.

- 11 **Either** (a) What is the difference between explanatory and unexplanatory causes?
Or (b) Does the raven paradox show that evidential support cannot be analysed in logical terms?
- 12 **Either** (a) Does the pessimistic induction provide evidence against scientific realism?
Or (b) Consider the advantages of either entity or structural realism over full-blooded scientific realism.

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HISTORY AND PHILOSOPHY OF SCIENCE (5)

Science and technology studies

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

SECTION A

- 1 How do Science and Technology Studies relate to the history and philosophy of the sciences?
- 2 Relativism is an important principle within several important schools of Science and Technology Studies. At the same time, Science and Technology Studies increasingly address normative questions (e.g. feminist critique of science, bioethics, environmental ethics). Does the relativism inevitably undermine the normative stance?
- 3 Do Science and Technology Studies tend to underestimate the role of the individual in the history of the sciences?

SECTION B

- 4 Does discovery by computer refute the 'strong programme' in the sociology of scientific knowledge?
- 5 **Either** (a) Explain and discuss meaning finitism.
Or (b) What, if anything, is social about $2+2=4$?
- 6 **Either** (a) Critically discuss how Marx understood the relation between technology and social structure.
Or (b) According to the actor-network account of Callon and Latour, the social study of science and technology forces us to rethink social theory. Why?
- 7 In what ways, if any, does the gender of the scientist affect the science the scientist does?
- 8 **Either** (a) Is there anything distinctive about the study of gender in science?
Or (b) 'Gender in science is really women in science'. Is it?
- 9 **Either** (a) Journalists, like scientists, usually claim to be 'objective'. Why, then, do journalists and scientists so often disagree?
Or (b) In what sense, if any, is the suburban living room the dominant site for the making of science in late twentieth century Britain?

- 10 **Either** (a) 'It is resistance to demobilisation rather than mobilisation which requires explanation' (WHITTEMORE, 1975, on the American Chemists after World War I). Explain and evaluate this claim.
Or (b) 'Scientists working under military patronage after World War II not only deceived themselves regarding the directions of their work, but also misled historians of science'. Discuss.
- 11 **Either** (a) To what extent, if any, is environmental ethics an issue for science?
Or (b) Can the view that science is morally neutral be defended? If so, how; if not, why not?
- 12 **Either** (a) What are the main issues dealt with by the new discipline of biomedical ethics?
Or (b) Is the sole ethical question raised by science that of the ethics of individual scientists?
- 13 To what extent can the history of the sciences be represented as progress through the use of reason? Discuss with reference to the views of one or more of: Bachelard, Koyré, Kuhn.
- 14 Is it possible or desirable to eliminate anachronism from the history of the sciences?

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HISTORY AND PHILOSOPHY OF SCIENCE (6)

History and philosophy of mind

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

SECTION A

- 1 What is the mind?
- 2 'The idea of a science of the mind is a contradiction in terms. While the rise of the sciences of mind in the twentieth century demonstrates the stubborn hold of this contradiction, it also raises the question as to why this century has found the need for the sciences of mind so compelling.' Discuss.
- 3 '...the argument in favour of Freudian theories would be very little weakened if it were to be admitted that every case published hitherto had been wholly invented by Professor Freud in order to illustrate his ideas and to make them more vivid in the minds of his readers. That is to say, the case for considering them seriously mainly depends at present on the appeal which they make to our own intuitions as containing something new and true about the way in which human psychology works' (JOHN MAYNARD KEYNES, 1925). Is this true of all theories of the mind?

SECTION B

- 4 'The experience of smelling a rose tells you nothing about the associated neural state and the neural state tells you nothing about the experience, so the state and the experience cannot be one and the same.' Discuss.
- 5 **Either** (a) How can the content of a thought be fixed by facts external to the thinker?
Or (b) What is the basis for beliefs about other people's mental states?
- 6 What are Husserl's main arguments against psychologism? Are they convincing?
- 7 **Either** (a) Explain and evaluate Husserl's criticism of Descartes?
Or (b) What are the main differences between Husserl's and Heidegger's accounts of intersubjectivity? Who has got it right?
- 8 Discuss the strengths and weaknesses of a socio-biological approach to the understanding of human behaviour.

- 9 **Either** (a) Why has the gene become a cultural icon?
Or (b) Is the new human genetics leading to a new eugenics?
- 10 How important were ideas of inheritance in early twentieth century British theories of EITHER child development OR mental illness?
- 11 **Either** (a) 'War improves mental health.' Does it?
Or (b) Is there a shift from the 'psychological complex' to 'governing the soul' in twentieth century Britain?
- 12 **Either** (a) "'You ask who this person in the dream can be. It's not my mother". We emend this to: "So it is his mother.'" (FREUD, 1925) What grounds does Freud have for interpreting patients' utterances in the way he does?
Or (b) 'The error of Freudian theory is to locate sex in the mind rather than the body.' Is this true?
- 13 **Either** (a) Why have psychoanalytic ideas about femininity been so influential and yet so controversial?
Or (b) 'Followers of psychoanalysis behave in turn like members of a sect, adepts of an esoteric technique, pre-scientific physicians to the tortured in mind, engineers of the soul and students of an exact science. This is both the strength - and the fatal weakness - of the psychoanalytic movement.' Discuss.

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HISTORY AND PHILOSOPHY OF SCIENCE (7)

Making modern medicine

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

SECTION A

- 1 Physicians have variously claimed to be 'rational', 'learned' and 'scientific'. What did they mean and why did they make such claims?
- 2 Account for the different views of disease produced in 'bedside', 'hospital' and 'laboratory' medicine.
- 3 'He who pays the piper calls the tune.' How have relations between doctors and patients changed?

SECTION B

- 4 **Either** (a) Why were ancient Greek doctors sometimes held up as models of scientific method?
Or (b) In what ways did the ancient Greeks conceptualise cure as purification?
- 5 Galen, a provincial Greek doctor in Rome, came to be the physician of Commodus, the son of the emperor Marcus Aurelius. How did he do it?
- 6 Who gained most from medical ethics before the Enlightenment?
- 7 How did the medieval textbook of medicine grow and then decay?
- 8 Under what circumstances have Europeans, from classical to modern times, thought it a good idea to dissect the bodies of humans and vivisection those of animals?
- 9 Discuss changes in how military medical services have been set up. Refer to specific historical examples.
- 10 This is the titlepage of the *De Humani Corporis Fabrica* of Vesalius, 1543. Building on this example, discuss the importance of illustration in Renaissance medicine.
- 11 What was distinctive about the use of the term 'soul' by European medical men before the nineteenth century?

- 12 **Either** (a) In the nineteenth century women routinely became nurses but had to struggle to gain a medical education. Why?
Or (b) 'That malaria was framed as a tropical disease had more to do with Western imperialism than with parasites and mosquitoes.' Do you agree?
- 13 **Either** (a) How have images and models of developing embryos come to represent the progress of a human pregnancy? What understandings have such representations replaced?
Or (b) In what ways did the science of embryology change in the decades around 1900?

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