

HSTR 207CS: Science & Technology in World History

Final Exam Study Guide

The final exam will incorporate material from your readings, the lectures, and our discussions. You should bring two blue books to the exam. We will provide blank sheets of paper for you to organize your thoughts and outline your answers. No notes or books will be allowed.

Sample Identification

Reductionism	Social Darwinism	Niels Bohr
Sociobiology	Gravitational Waves	Werner Heisenberg
eugenics	Academic-Military-Industrial Complex	Fission vs Fusion

Sample Essay Questions

Methods:

Explain the cumulative (Newtonian) model of science, the paradigm (Kuhn) model in science, and ecosystem (Johnson) model of science.

Give examples of the various connections between science and society (in the history of science), and between nature and culture (in environmental history).

Modern Biology:

What does Charles Darwin mean when he writes in his “Conclusion” that “we will no longer look at organic beings as savages look at ships”?

What revolutions, and in which fields, does Darwin predict will occur owing to his theory of evolution through natural selection?

Why does Darwin end his *On the Origin of Species* with planets revolving according to the “fixed law of gravity”?

How does Charles Davenport, in *Heredity in Relation to Eugenics*, argue for the need for eugenics? Which human traits does he define as problematic or in need of improvement?

According to Herbert Spencer Jennings, who are the “Undesirable Aliens”?

According to Harry Laughlin, in “Eugenical Sterilization,” how should sterilizations be administered?

Is there a “God gene”? How would socio-biologists argue that such a gene obviously exists?

Why is Marcy Darnovsky concerned that CRISPR technology will lead to the “emergence of a market-based eugenics”?

In defending gene editing, how does John Harris use the terms “nature” and “natural”?

Describe how CRISPR technology works. How could it be used to help solve the problem of the Zika virus? What, according to critics, are some of the unintended consequences we need to worry about?

What did Blake Weldenheft argue were the ethical considerations surrounding CRISPR research?

Modern Physics:

Why does Vannevar Bush describe science as the endless “frontier”? How does he argue for “basic” vs “applied” science? Where should basic science be practiced, and why?

Why is Dwight Eisenhower so concerned about the “military-industrial complex”?

Why about J. William Furbright? Why does Barry Goldwater argue that we need more, not less, of the military-industrial complex?

Bohr worked at Los Alamos to help create an atomic bomb. Is he as culpable as Heisenberg? Explain.

Frayn said that his play was not about science. So, what is it about?

How does Frayn use Heisenberg’s uncertainty principle to represent both physical and historical reality?

Why did Heisenberg visit Bohr in Copenhagen in 1941?

How does Crosby use the concept of “energy returned on energy invested” (EROI)?

What are the complications for using hydrogen as an energy source?

According to Crosby, what are humanity’s possible energy futures?

What did Neil Cornish argue were the ethical considerations surrounding gravitational wave research?

Large Essay Question

One extremely intelligent professor once wrote:

“It is one thing to acquire the scientific and technological sophistication to understand environmental questions; it is quite another to integrate solutions into deeply rooted religious and cultural traditions, established political and national ideologies, and entrenched behaviors of production and consumption. Solving today’s most pressing environmental questions will require a combination of scientific and technological knowledge and the humanistic and artistic knowledge that comes from analyzing human values, aesthetics, needs, and desires.”

Describe what that professor means by discussing examples we have used in class.