SCIENCE, TECHNOLOGY AND SOCIETY

Academic Year: 2021-2022 | First Semester

Instructor: 马大年 (Macuglia Daniele)

Assistant: 毛燕超 (Mao Yanchao)

CLASSROOM TEST #1

November 26, 2021

Test duration: 1.5 hours

STUDENT NAME: _____

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

GENERAL INSTRUCTIONS:

- Sign your name on the first page and at the bottom of all other pages.
- Laptops, tablets, smartphones (etc.) are not allowed during the test.
- You may not consult your notes, the textbook by Sergio Sismondo or other articles and book chapters we have been using in class.
- If you have any problems with English, raise your hand and we will help you. Don't worry: you will be given a little extra time:)

GRADING:

Each **closed-ended question** always has one (and only one) correct answer.
Your responses to the closed-ended questions will be graded as follows:
-2 (wrong answer);
0 (no answer);
1 (correct answer).

Your responses to the **open-ended questions** will be graded as follows:
0 (no or bad answer);
1 (fair response);
2 (good answer).

You will be offered the opportunity to make a few extra points, should that be necessary for you. On page 7 and page 8 you will find five **bonus open-ended questions**. They are labeled B-1, B-2, B-3, B-4, B-5 and you will be allowed to choose *a maximum of two* (letting you get a maximum of 4 bonus points).

MAXIMUM SCORE: 21 points (plus up to 4 bonus points, if necessary).

The final grade depends on the percentage of the maximum score you get: 97% or more of the maximum score, grade: A+; between 95% and less than 97%, grade: A; between 90% and less than 95%, grade: A-, between 85% and less than 90%, grade: B+, etc. The level of sufficiency is 60% of the maximum score.

Student signature: _____
地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

IMPORTANT NOTICE:

To help you, a Chinese version of the entire test is located after the English portion, from page 10 onward, and you can consult it as an additional resource. However, prioritize the English text and ask the instructor if you have any doubts. **The final answers should appear in the English portion of this document**, but you can use the Chinese part as a support for writing your own tentative answers. Also, keep your answers to open-ended questions reasonably succinct. If you need additional sheets, ask the instructor.

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

1) Logical positivism is a philosophical approach to:

□ the logic of the deductive process; it was developed by the Vienna Circle,

□ the logic of inductions in natural science; it was developed by structural functionalists,

□ deductions in natural science that logically derives from falsificationism,

□ the logic of the inductive process; it was initially associated with the Vienna Circle.

2) According to David Hume, and later also Ludwig Wittgenstein and Nelson Goodman, a claim like "the sun rises every 24 hours" is:

□ verified with certainty by induction,

□ an unscientific claim,

□ a problematic sentence because *sameness* is not a fully defined concept,

□ verified with certainty by deducing it from Newton's law of universal gravitation.

3) Regarding falsificationism, in the history of science:

□ there is not strong evidence of scientists who tried to falsify their own theories,

□ there is strong evidence of scientists openly trying to falsify their own theories,

□ the attempt to falsify scientific theories has existed since the modern period but has become a common practice only in contemporary history,

□ all of the major scientific theories have proven to be essentially false.

4) The Duhem-Quine thesis is the claim that:

□ any hypothesis/scientific theory can be conclusively tested in isolation,

□ scientific principles might imply a certain degree of indetermination,

□ if possible, a scientific hypothesis/theory should *always* be tested in isolation,

□ a scientific hypothesis/theory can never be conclusively tested in isolation: what is tested is an entire framework or a "web of beliefs".

5) Can you explain in a few words what *underdermination* means?

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

6) For Martin Heidegger, distinctly modern technology is:

□ independent of scientific rationality,

□ divided into *polytechnics* and *monotechnics*,

□ the application of science in the service of power,

□ the application of power in the service of science.

7) According to Thomas Kuhn, scientific observations are:

□ theory-dependent,

□ objective raw materials,

□ independent of any background beliefs,

□ incommensurable facts.

8) In the Kuhnian perspective, we can talk of scientific progress:

□ never!

□ during revolutionary changes, when moving from an old paradigm to a new one,

□ essentially always: the history of science shows us continuous progress,

□ during periods of normal science, e.g, through puzzle-solving.

9) Kuhn argues that theories belonging to different paradigms are incommensurable. This means that:

□ theories of the new paradigm are *incommensurably* more advanced than those of the previous paradigm since they explain all the old facts as well as the new ones,

□ people working in different paradigms see the world in different ways (i.e., they lack a common measure),

□ even if the paradigms change, the basic quantities of physics (e.g., length, mass, time, electric current) hold the exact same meaning, while derived quantities (e.g., force, frequency, speed) take on completely new meanings,

□ scientists working in different paradigms use different types of scientific instruments and therefore fail to communicate.

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

10) *Epistemic cultures* can be briefly defined as:

11) What is a *trading zone*?

12) *Pidgins* are:

□ complex languages characterizing different epistemic cultures,
□ physical characteristics of boundary objects,
□ simplified languages characterizing trading zones,
□ scientific instruments owned by amateur collectors.

13) For Robert Merton, the institutional goal of science is the extension of:

□ certified knowledge,
□ mathematical theories,
□ interdisciplinary collaborations,
□ empirical evidence.

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

14) In 1942, Merton described four norms that compose the *ethos of science*:
□ rationalism, universalism, communism, and objectivity,
□ universalism, communism, disinterestedness, and objectivity,
□ universalism, communism, disinterestedness, and organized skepticism,
□ rationalism, objectivity, disinterestedness, and organized skepticism.

15) The *ethos of science* and the *ethics of science*:
□ are exactly the same thing,
□ are both established by social norms,
□ never change over time,
□ are still little addressed by the sociology of science.

16) Merton's approach to science belongs to:
□ neopositivism,
□ logical rationalism,
□ structural realism,
□ structural functionalism.

17) The so-called *strong programme* is a strand of research dealing with:
□ the content (not just the organization) of scientific knowledge in sociological terms,
□ a sociological approach to the hard sciences alone (e.g., astronomy, biology, chemistry, physics),
□ the philosophical understanding of strong interaction, i.e., an approach to the conceptual foundations of one of the four fundamental interactions in physics,
□ engaging top scientists in HPS research.

18) What does Karin Knorr Cetina mean by saying that "nature is not to be found in the laboratory" (*The manufacture of knowledge*, 1981)? She means that:
□ as opposed to the social construction of scientific and technical realities, the objective meaning of scientific concepts can be found only in nature and does not depend on human beings,
□ the most immediate impact of laboratory work is its contribution to the modification of nature and the environment in which human beings live,
□ scientists should reevaluate laboratory work if they truly want to understand nature,
□ knowledge derived from laboratories is knowledge derived from things that, very often, are non-natural.

Student signature: _____
地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

B-1) Briefly explain what we mean by whig history (or, rather, whig historiography).

B-2) What do we mean when we talk about *boundary objects* from the perspective of science, technology and society?

B-3) Do you think that the Duhem-Quine thesis poses a problem of induction or deduction? What does it tell us about falsificationism?

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

B-4) Try to describe, succinctly, the difference between realism and constructivism in the philosophy of science. Do you see yourself as more of a realist or a constructivist?

B-5) Just give an idea of what we mean when we talk about social construction of scientific and technical realities...

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

1) 逻辑实证主义是:

□ 一种关于演绎过程的逻辑的哲学方法；它是由维也纳圈开发的，

□ 一对自然科学中的逻辑归纳的一种哲学方法；它是由结构功能论者提出的，

□ 一对自然科学中的推理的一种哲学方法，它在逻辑上源于证伪主义，

□ 一种关于归纳过程的逻辑的哲学方法；它最初与维也纳圈有关。

2) 根据大卫-休谟，以及后来的路德维希-维特根斯坦和纳尔逊-古德曼，像"太阳每24小时升起"这样的说法是:

□ 通过归纳法得到确定性的验证，

□ 不科学的说法，

□ 一个有问题的句子，因为同一性不是一个完全定义的概念，

□ 通过从牛顿的万有引力定律推导出它，得到了肯定的验证。

3) 关于证伪主义，在科学史上:

□ 没有科学家试图证伪自己的理论的有力证据，

□ 有强有力的证据表明，科学家公开地试图证伪他们自己的理论，

□ 对科学理论进行证伪的尝试自近代以来就一直存在，但在当代历史上才成为一种常见的做法，

□ 所有主要的科学理论都被证明是根本性的错误。

4) 根据Duhem-Quine论题:

□ 任何假说/科学理论都可以孤立地得到确凿的检验，

□ 科学原则可能意味着一定程度的不确定性，

□ 如果可能的话，一个科学假设/理论应该总是被孤立地测试，

□ 一个科学假设/理论永远不可能孤立地得到确凿的检验：所检验的是整个框架或"信仰之网"。

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

5) 你能用几句话解释一下什么是"underdetermination"吗?

6) 在马丁·海德格尔看来，明显的现代技术是:

□ 独立于科学理性的,

□ 分为 *polytechnics* 和 *monotechnics*,

□ 科学为权力服务的应用,

□ 为科学服务的权力的应用。

7) 在托马斯·库恩 看来，科学观察:

□ 是依赖于理论的,

□ 是客观的原材料,

□ 是独立于任何背景信念的,

□ 与其他观察是不可比拟的。

8) 根据库恩的观点，我们可以谈论科学进步…

□ 永远不会！

□ 在革命性的变化中，当从一个旧范式转向一个新范式时,

□ 基本上总是这样：科学的历史向我们展示了持续的进步,

□ 在正常的科学时期，例如，通过解谜的方式。

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

9) 库恩认为，属于不同范式的理论是不可比的。这意味着:

□ 新范式的理论比以前的范式的理论不可比拟地先进，因为它们既能解释所有的旧事实，也能解释新事实，

□ 在不同范式下工作的人以不同的方式看待世界(即，他们缺乏共同的衡量标准)，

□ 即使范式改变了，物理学的基本量（如长度、质量、时间、电流）的含义完全相同，而派生量（如力、频率、速度）则具有全新的含义，

□ 在不同范式下工作的科学家使用不同类型的科学工具，因此无法沟通。

10) "Epistemic cultures"可以简要地定义为...

11) 什么是"trading zone"?

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

12) "Pidgins"是:

□ 特定"epistemic cultures"的典型复杂语言,

□ "boundary objects"的物理特征,

□ 典型的"trading zones"的简化语言,

□ 业余收藏家拥有的科学仪器。

13) 在 罗伯特·默顿看来，科学的体制目标是扩展:

□ 认证知识,

□ 数学理论,

□ 跨学科合作,

□ 经验证据。

14) 1942年，默顿描述了构成"ethos of science"的四个规范:

□ 理性主义、普遍主义、共产主义和客观性,

□ 普遍主义、共产主义、无利害关系和客观性,

□ 普遍主义，共产主义，无利害关系，和有组织的怀疑主义,

□ 理性主义、客观性、无私性和有组织的怀疑主义。

15) "Ethos of science"和"ethics of science"是:

□ 完全一样的东西,

□ 都是由社会规范确立的,

□ 永远不会随时间变化的要素,

□ 科学社会学仍然很少涉及的问题。

16) 默顿的科学方法属于:

□ 新实证主义,

□ 逻辑理性主义,

□ 结构现实主义,

□ 结构功能主义。

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

17) 所谓的"strong programme"侧重于:

□ 社会学方面的科学知识的内容(而不仅仅是组织),

□ 仅对硬科学（如天文学、生物学、化学、物理学）采取社会学方法,

□ 对强相互作用的哲学理解，即对物理学中四个基本相互作用之一的概念基础的一种方法,

□ 让最优秀的科学家参与HPS研究。

18) 卡琳-克诺尔-塞蒂纳说 "在实验室里找不到自然"（《知识的制造》，1981）是什么意思？她的意思是:

□ 相对于科学和技术现实的社会建构，科学概念的客观意义只能在自然界中找到，不取决于人类,

□ 实验室工作最直接的影响是它对改变自然和人类生活环境的贡献,

□ 如果科学家真的想了解自然，就应该重新评估实验室工作,

□ 从实验室获得的知识是来自于那些往往是非自然的事物的知识。

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

B-1) 简要解释一下我们所说的 **"whig history"**(或者说，**"whig historiography"**)是什么意思。

B-2) 当我们从**STS**的角度谈论**"boundary objects"**时，我们意味着什么?

B-3) 你认为**"Duhem-Quine**论**"**提出了一个归纳或演绎的问题吗? 它对证伪主义有什么启示?

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn

B-4) 试着简明扼要地描述一下科学哲学中现实主义和建构主义之间的区别。你认为自己更像是一个现实主义者还是一个建构主义者?

B-5) 只要给我们一个概念，当我们谈论科学和技术现实的社会建设时，我们指的是什么?

Student signature: _____

地址：中国 北京市海淀区颐和园路5号
邮编：100871
www.pku.edu.cn