

Instructions: Write name legibly. Explain so that smart people who have not taken our class will understand.

Write down the *modus tollens* form of argument by which we reject hypotheses (2a in Hempel reading).

If _____, then _____.

But _____.

So, _____.

Write down the *modus ponens* form of argument by which we support hypotheses (2b in Hempel reading).

If _____, then _____.

And _____.

So, _____.

Indicate whether the following statements are true or false by underlining one or the other option.

True False *The form of argument by which we reject hypotheses is (deductively) valid.*

True False *The form of argument by which we affirm hypotheses is (deductively) valid.*

True False *Hempel thinks that we can conclusively disprove hypotheses.*

True False *Hempel thinks that we can conclusively prove hypotheses.*

True False *Hempel thinks that favorable test results provide some support for their hypotheses.*

Complete the following argument forms based on the corresponding scientific theories.

(a) Torricelli found that mercury can be pumped only a 14th as high as water can be pumped above its pump. That is what we would expect if earth's atmosphere exerts downward pressure. So earth's atmosphere probably does exert downward pressure.

If _____, then we would observe _____.

We did observe _____.

So, it is probably the case that _____.

(b) Pascal found that his barometer's mercury at the top of a mountain was lower than it was at the bottom of the mountain. That is what we would expect based on the hypothesis that there is less more atmosphere pressure at higher altitudes. So that theory of atmospheric pressure is probably true.

If _____, then we would observe _____.

_____.

We did observe _____.

_____.

So, it is probably the case that _____.

Hempel defines some terms for us. Finish the definitions below.

- (a) *“Inductive inferences... are sometimes described as leading from _____
to _____”* (p. 7).
- (b) *“the premisses of an inductive inference are often said to _____
_____, whereas the premisses of a deductive inference
_____”* (p. 7-8).

Complete the following claims from Hempel (using Hempel’s words).

- (c) *“Facts/data are relevant to a hypothesis if either _____ or
_____ can be _____ the hypothesis”* (p. 9).
- (d) *“_____ determine,
among other things, what data should be collected at a given point in scientific investigation”* (p. 9).
- (e) *“Scientific objectivity is safeguarded by...the checking of _____
_____”* (p. 12).
- (f) *“the maxim that data should be gathered without guidance by antecedent hypotheses about the
connections among the facts under study is _____, and it is
certainly not _____”* (p. 9).

Indicate whether the following statements are true or false, according to Hempel.

- | | | |
|------|-------|--|
| True | False | <i>Hempel thinks that scientists do <u>not</u> consider hypotheses until they have gathered, analyzed, and classified all of the facts. (p. 9)</i> |
| True | False | <i>Hempel thinks that scientists should <u>not</u> consider hypotheses until they have gathered, analyzed, and classified all of the facts. (p. 9)</i> |
| True | False | <i>Hempel thinks that science is objective. (p. 12)</i> |
| True | False | <i>Hempel thinks that science is unbiased. (p. 8-10)</i> |
| True | False | <i>Hempel thinks that “the method of hypotheses” can prove hypotheses to be true. (p. 13-14)</i> |
| True | False | <i>Hempel thinks that “the method of hypotheses” is inductive in some sense. (p. 14).</i> |
| True | False | <i>Hempel thinks that narrow inductivism is inductive in the same sense as wide inductivism.</i> |
| True | False | <i>Hempel thinks that the narrow inductivism is as plausible as wide inductivism.</i> |

Recount the steps in Hempel’s view of science as “the method of hypotheses” (wide inductivism) (p. 13):

- I. _____
_____.
- II. _____

III. _____

Recount the four-step, “narrow inductivist” (Baconian) scientific method that Hempel quotes (or lists) (p. 8):

1. _____

2. _____

3. _____

4. _____

In your own words, recount Hempel’s reasons to think that narrow inductivism is a non-starter.

- A. _____

- B. _____

- C. _____

- D. _____

Do the first two premises support the conclusion?

- | | | |
|-----|----|---|
| Yes | No | <i>All flowers have petals. Roses have petals. So, roses are flowers.</i> |
| Yes | No | <i>If something is a flower, then it has petals. Roses have petals. So roses are flowers</i> |
| Yes | No | <i>All vehicles have wheels. Boats are vehicles. So, boats have wheels.</i> |
| Yes | No | <i>Is something is a vehicle, is has wheels. Boats are vehicles. So, boats have wheels.</i> |
| Yes | No | <i>If the earth is flat, then horizons will seem flat. Horizons seem flat. So, the earth is flat.</i> |
| Yes | No | <i>If the earth is flat, then horizons are perfectly flat. But horizons aren’t. So, the earth isn’t flat.</i> |
| Yes | No | <i>All things that have engines need oil. Cars need oil. So cars have engines.</i> |
| Yes | No | <i>If something has an engine, then it needs oil. Cars need oil. So cars have engines.</i> |
| Yes | No | <i>All things that have engines need oil. Cars have engines. So cars need oil.</i> |