

Critical Analysis and Reasoning Skills Sample Paper 1

Passage I (Questions 1–6)

The notion that scientific progress is driven solely by the accumulation of empirical facts has long been challenged. One influential critique argues that scientists operate within shared frameworks of assumptions—paradigms—that determine which questions are legitimate and which observations count as relevant data. When anomalies accumulate that cannot be reconciled with the reigning paradigm, a period of crisis may ensue, eventually resolved by a revolutionary shift to a new paradigm. Under this view, successive paradigms are often incommensurable: the concepts and standards of one cannot be fully translated into those of another. Consequently, the choice between competing paradigms cannot be settled by a neutral algorithm of evidence alone; it also involves persuasion, aesthetic judgment, and shifts in the scientific community's values. Critics of this account reply that it risks sliding into relativism, undermining the claim that later theories are objectively better than earlier ones. Defenders counter that progress can still be recognized retrospectively by the increased puzzle-solving power and predictive scope of the new framework, even if no timeless standard adjudicates the transition itself.

Question 1

The author's primary purpose in the passage is to:

- a) Defend the view that scientific change is purely cumulative
- b) Outline a contested account of scientific change and note objections to it
- c) Argue that all scientific theories are equally valid
- d) Provide a detailed history of a specific scientific revolution

Correct Answer: b) Outline a contested account of scientific change and note objections to it

Explanation:

The passage presents the paradigm-shift view, acknowledges the charge of relativism, and records the defenders' reply, without fully endorsing either side.

Question 2

According to the passage, successive paradigms are often "incommensurable" in the sense that:

- a) They address completely unrelated domains of nature
- b) Their core concepts and evaluative standards cannot be fully translated into one another
- c) They always make identical empirical predictions
- d) One is invariably more mathematical than the other

Correct Answer: b) Their core concepts and evaluative standards cannot be fully translated into one another

Explanation:

The text explicitly defines incommensurability as the inability to translate concepts and standards fully from one paradigm into another.

Question 3

The critics mentioned in the passage are most concerned that the paradigm account:

- a) Overemphasizes the role of experimental data
- b) May lead to a form of relativism that weakens claims of objective progress
- c) Ignores the importance of scientific institutions
- d) Applies only to the physical sciences

Correct Answer: b) May lead to a form of relativism that weakens claims of objective progress

Explanation:

The passage states that critics fear the account "risks sliding into relativism, undermining the claim that later theories are objectively better."

Question 4

Defenders of the paradigm view maintain that scientific progress can still be recognized by:

- a) A timeless, paradigm-independent algorithm of confirmation

- b) The increased puzzle-solving power and predictive scope of the newer framework
- c) The greater mathematical elegance of earlier theories
- d) The unanimous vote of the scientific community at the moment of transition

Correct Answer: b) The increased puzzle-solving power and predictive scope of the newer framework

Explanation:

The final sentence attributes this retrospective criterion to the defenders.

Question 5

Which of the following, if true, would most weaken the defenders' reply to the charge of relativism?

- a) Later paradigms routinely solve more puzzles and make broader predictions than their predecessors
- b) Some paradigm shifts have been accompanied by temporary losses in predictive scope that were never recovered
- c) Scientists frequently cite aesthetic considerations when choosing among theories
- d) Anomalies are more common in periods of normal science than during crises

Correct Answer: b) Some paradigm shifts have been accompanied by temporary losses in predictive scope that were never recovered

Explanation:

If newer frameworks sometimes fail to regain lost predictive power, the defenders' retrospective criterion of increased scope is undermined.

Question 6

The passage suggests that the choice between competing paradigms involves all of the following EXCEPT:

- a) Persuasion
- b) Aesthetic judgment
- c) A neutral algorithm of evidence alone
- d) Shifts in community values

Correct Answer: c) A neutral algorithm of evidence alone

Explanation:

The text states that the choice "cannot be settled by a neutral algorithm of evidence alone."