

Solutions

Authored self-check guidance: accept equivalent correct methods and supported interpretations. The points check reasoning, not an official grade.

2.1 B – A satisfies both inequalities; B exceeds cost. A rejects A despite both limits being met; C exceeds the cost cap; D incorrectly allows that excess merely because deflection is smaller.

Correct response linked to the given case.

2.2 C – Alternative causal conditions must be controlled while thickness changes. A controls a label rather than causal conditions; B mistakes repetition for control; D fixes the factor whose effect is to be tested.

Correct response linked to the given case.

2.3 dependent – Deflection is the measured response to changes or a test load.

Correct response linked to the given case.

2.4 False – It measures variability but does not untangle systematically linked changes.

Correct response linked to the given case.

3.1 Control mean 42°C, range 41–43°C; A mean 34°C, range 33–35°C; B mean 31°C, range 30–32°C. A costs $4 \leq 5$ and reaches at most 35°C, so it meets both in these trials. B's lower temperatures do not overcome cost $7 > 5$. This does not guarantee future durability or temperatures.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence
. Accurate conditions, checks or qualification.

3.2 Thickness is changed and final temperature measured. Material, length, fit, starting temperature and operating conditions are controlled in Experiment 2. The proposal changes material and thickness together, so either could explain a difference; repeats would not remove that confounding.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence.
Accurate conditions, checks or qualification.

3.3 Measure its actual cost and durability, while repeating matched final-temperature tests with the same material, length, fit, power, starting temperature and duration. The heavier sleeve's cost cannot be assumed unchanged. State acceptance limits before choosing, rather than deciding from cooling alone.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence.
Accurate conditions, checks or qualification.