

Simplification of Questions

Phillip Capehart, RII Examiner



Discussion Goals

- What does simplifying a question mean?
- What processes are involved?
- What references are available?

REFERENCES

NUREG 401-9 “Psychometric Flaws” & App. B “Written Exam Guidelines”:

- Confusing language
- Ambiguous questions
- Collection of T/F statements
- Implausible distractors
- Backward logic
- Using unequal question terminology and format may be inappropriate (remember your target audience)
- Using inconsistent terminology or format within the same exam is inappropriate

What are the benefits of simplification?

- Clarifies the question
- Helps to identify minutia
- Prevents backward logic
- Identifies non-plausible distractors
- Reduces candidate stress
- Establish consistency in question style

Define the question, task, or problem in the stem of the question.


In designing multiple-choice questions that are operationally based and require an application/use scenario, one suggestion is to provide the conditions in the first part of the question, separated by a double space from the body of the question, and blocked to the left column with each condition bulleted, as in the following example:

Given the following conditions:

- Both main feed pumps tripped.
- Auxiliary feedwater (AFW) automatically started
- AFW valves reset to control steam generator water level
- AFW suction pressure decreased to 7 psig.
- The SRO has entered 1-ONP-09.02

Which ONE of the following describes the AFW pump response for the given conditions?

- a. Suction will automatically shift to the nuclear service water system.
- b. Suction will automatically shift to the upper surge tank
- c. Trip when suction pressure decreases to 5 psig.
- d. Trip after a 6-second time delay.



Include as much necessary information as possible about the problem or situation in the stem, leaving only the solution, action, or effect for the answer options.

Consider the following “poor” and “better” examples:

At 50% power...

- a. The equilibrium xenon reactivity worth is approximately equal to the equilibrium xenon worth at 100% power.
- b. The equilibrium xenon reactivity worth is approximately one-half the equilibrium xenon worth as 100% power.
- c. The equilibrium xenon reactivity worth is approximately two-thirds the equilibrium xenon worth at 100% power.
- d. The equilibrium xenon reactivity worth is approximately three-fourths the equilibrium xenon worth at 100% power.



(Rewritten)

How does the equilibrium xenon reactivity worth at 50% power compare to the equilibrium xenon reactivity worth at 100% power?

- a. equal to
- b. one-half
- c. two-thirds
- d. three-fourths

Provide sufficient counterbalance in questions with multi-part answers.

The reactor coolant system (RCS) is in MODE 3 (Hot Standby), with no reactor coolant pumps (RCPs) running. If the once-through steam generator (OTSG) pressure is decreased, according to the plant verification procedure, which of the following temperature responses indicates the presence of natural circulation?

- a. T-H increases, T-C remains the same
- b. T-hot increases and T-cold decreases
- c. T-hot and T-cold decrease
- d. T-H remains the same, T-C decreases



Unit 1 is currently at 82% power. A downpower is in progress to remove the 1A MFW pump from service.

Which of the following plant conditions would require you to direct an IMMEDIATE manual trip of the reactor?

- A. Instrument air pressure is currently 59 psig and lowering.
- B. 1A and 1B SG levels are 75% and increasing.
- C. BOTH heater drain pumps trip.
- D. 4.16 KV bus 1B3 de-energizes due to an electrical fault on the bus.



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A liquid release is to be performed on the 1B Waste Monitor Tank with R-6627 out of service.

Which ONE of the following are required to be performed prior to approving the release permit?

- A.
 - 1.) Two independent release rate calculations.
 - 2.) Two Independent discharge valve alignments.
 - 3.) Two Independent verifications of required number of ICW and CW pumps operating.

- B.
 - 1.) Two release rate calculations.
 - 2.) Two independent radioactivity analysis.
 - 3.) FRG review and approval of Liquid release

- C.
 - 1.) Two independent radioactivity analysis.
 - 2.) Two independent release rate calculations.
 - 3.) Two Independent discharge valve alignments.

- D.
 - 1.) Two independent radioactivity analysis.
 - 2.) Two independent release rate calculations.
 - 3.) A Temporary System Alteration documenting R-6627 out of service.

A liquid release is to be performed on the 1B Waste Monitor Tank (WMT) with R-6627, WMT effluent radiation monitor, out of service.

Which ONE of the following is required to be performed prior to approving the release permit?

- A. Two independent release rate calculations.
- B. Plant General Manger letter giving permission to release the tank.
- C. Chemistry Supervisor letter giving permission to release the tank.
- D. Temporary System Alteration documenting R-6627 being out of service.

REVIEWING TEST ITEMS

Examination reviewers can assist examination authors by performing technical content, level of difficulty, psychometric, and editorial checks, and it is advantageous to consider each of these four areas separately and in this order. If there is a need to revise an item on the basis of one stage of the review, the changes should be made before going further because the changes at each stage could well affect the subsequent reviews.

For example, a criticism that appears to affect only one distractor may ultimately lead to changes in other parts of the item, so time spent reviewing the item for grammar and punctuation may be wasted.

There are also some advantages associated with having the questions reviewed for clarity, grammar, expression, spelling, and punctuation by someone who is not familiar with the area being tested. Such a reviewer can determine whether an item can be correctly answered by a person without knowledge of the field.

The examination author and reviewers should ask themselves the following types of questions:

- Will the examinees clearly know what they are expected to do?
- Do they have all the information they need to work with?
- Does answering the question depend on certain assumptions that must be stated?