A new comprehensive final exam

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My objectives for an **ideal** final exam:

- Clearly evaluates a student’s mastery of the set class goals.
- Requires review of **all** the material, *beginning to end*.
- Leads to further insights about the subjects covered.
- Makes connections between and shows the interdependence of the various topics.
- Isn’t stressful for students (*or me*).
A new kind of final exam

During the term:

- Instructor formulates (20) complex questions covering all course topics.

- Questions are numbered 1-20 so that the topics form a natural sequence for the course.
7-10 days before the scheduled exam:

- Provide students with the 20 questions – i.e., give them the final exam!

- Each student will present the answer to one of these questions – but they don’t know which one. They should prepare answers for all 20 questions.

- Students may collaborate as they prepare.

- Each student can bring notes, limited to 3 sheets of paper, front and back, to the scheduled final exam. These notes are handed in.
At the exam:

- Each student picks a unique number from a hat. This is the question that that student will answer.
- Students are given 15 minutes to prepare a presentation in answer to their assigned question. They may use their notes to prepare.
- Presentations are called in order, 1 – 20.
- Each student has 5 minutes to present their answer and 2 minutes to answer questions.
- Students in the audience must write comments, questions, or observations for each of their peers’ presentations. These notes are handed in.
• Grades are given as follows:

• 50% for thoroughness, accuracy, clarity and completeness of the answer to their assigned question

• 50% for the detail, quality, and relevance of their notes on other students’ presentations.
Lessons learned:

- Explain the format of the final at the beginning of term. Don’t surprise them with it.

- Provide practice!
  - Assign homework questions that model the type of questions on the final.
  - Randomly choose student to present an answer to the HW during the next class. WARN THEM first.

- Include additional assessments during the semester – mid-terms, essays, etc.
Lessons learned:

- Make sure grading is well-balanced between their talks and their peer assessments.
- Take breaks at reasonable intervals.
- Refreshments help.
This final exam achieves:

• A review of all the material.

• “Good” questions require connections to be made, problems to be solved.

• Practice in presenting coherent, well-formulated answers.

• The final becomes a concise summary of the entire course as questions are answered.

• Allays student fears: “What should I study? What is important?”
A sample question:

You live in a moon colony. You can see the earth in your “sky.”

- Describe a typical lunar day.
- What kind of eclipses would you see while living in this colony?
For the future:

A repository of “good” questions which necessitate thinking across topics and present simple astronomical puzzles that require application of learned material.