

READ THIS FIRST:

- This exam is closed book, closed notes, closed computer, closed everything, except: Everyone is allowed to bring their own writing on 14 square inches, meaning the size of a standard 3.5" x 2.0" business card, front and back.

If you exceed this space, you are not allowed to use any of it.

- The number in parentheses in front of each question is the number of points. Almost all of them are 3 points.
- You should be able to complete the exam in about 60 minutes. However, you have 120 minutes to answer the questions.
- Pretty much every question can be answered in one sentence or less (and one minute or less). Some are just one word (if applicable/useful, please give a brief 5 word reason why).
- Write extremely clearly. If I cannot understand what you mean, you lose. Generally, try to be concise. If I cannot read your hand-writing, you lose. For a clearly wrong answer, you can receive negative points. The point is to stop you from wild-guessing or snowing me, not to stop you from writing what you really know. If you have no clue about the answer, you are probably better off leaving the answer blank. If you have some clue, give it your best shot. I will liberally subtract points for wrong answers—in particular, I hate the idea of 3 different answers, one of which is correct, two of which are incorrect — unless you clearly outline assumptions that you have to make because my question is ambiguous.
- Write your answers in the spaces below the questions.
- If you believe a question is ambiguous, please make reasonable assumptions, and spell them out in your answer. I may also deliberately include questions that cannot be answered. If you believe this is the case, please explain why you cannot answer a question.
- When questions are about the future, it means to ask “Is the widespread consensus of scientists that...”

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1. (1) What is your name, UCLA email address, and student id?

2. (1) Did you fill out the course evals?

3. (3) What fraction of world emissions are expected to be from OECD and non-OECD countries by 2050?

4. (3) What's the problem with temperature and CO₂ graphs over hundreds of thousands or millions of years to show how CO₂ influenced temperature?

5. (3) How much is Earth expected to warm from now to 2100 under benevolent neglect (RCP 6-7)?

6. (3) How much is Earth expected to warm from now to 2100 under concerted climate change action (RCP 4-5)?

7. (3) Is it reasonably possible that Earth will warm 5-6°C by mid 2150 under RCPs 4-6?

8. (3) How much will sea levels rise by 2100?

9. (3) Is climate change expected to be harmful? If so, by how much relative to what?

10. (3) What is the expected net cost of climate change to the European Union?

11. (3) What countries will experience most terrestrial harm from climate change? Why?

12. (3) The WHO predicts a few hundred-thousand early deaths from global climate-change by 2050. What does it name as the most important causes?
13. (3) Will China be the source of most emissions growth this century?
14. (3) How many tons of greenhouse gases per year (with land charge) does the world emit ca 2020?
15. (3) Will stone weathering and ocean calcite remove human excess CO₂ emissions? If so, what's the problem? If not, why not?
16. (3) How do per-person emissions and income in China compare to Europe?

17. (3) What is the key input disagreement among IAMs users?

18. (3) What is the key ethics disagreement among IAMs users?

19. (3) Who will likely implement the worldwide carbon tax proposed by the IAMs?

20. (3) What are the two main criteria that viable climate-change actions must fulfill, at least according to your instructor's book claims?

21. (3) Would the world be better off with a global emission tax?

22. (3) Why is the Montreal Treaty not a good analogous example for a CO₂ treaty?
23. (3) Could reforestation plausibly be big enough to make a reasonable difference when it comes to global warming?
24. (3) Who invented “carbon-footprint watching” for consumers?
25. (3) What fraction of new and replacement coal plants being built today are being built in non-OECD countries?
26. (3) What are the key problems of Lithium batteries today for use as grid storage?

27. (3) Is dispatchable electric power more valuable (expensive) than baseload power?

28. (3) What fraction of today's power is fossil-fuel and biomass based?

29. (3) What fraction of today's electricity is fossil-fuel based?

30. (3) What fraction of electricity generation in 2050 is likely to be from solar and wind?

31. (3) Does the EIA predict fossil-fuel use to decline by 2050.

32. (10) What is today's rough LCOE for the major source of grid electric power?
33. (3) What is the difference between the LCOE and marginal cost of generation?
34. (3) How much more electricity storage is needed to go from an 80% clean grid to a 100% clean (net-zero) grid?
35. (3) At today's levels, what is the marginal cost of carbon sequestration via foresting?
36. (3) At today's levels, what is the marginal cost of carbon sequestration via industrial sequestration?

37. (3) What is the main proposed engineering solution to reduce solar radiation and is it expensive?

38. (3) What are the book's three key suggestions to reducing global warming?

39. (5) What was the key problem for the JBS' Texas project?

40. (5) What is BHE doing at the Salton Sea?

41. (5) Why did Solyndra fail?

42. (5) How does Anil expect to be successful with better fuse boxes?