
print name

INSTRUCTIONS:

1. The *Natural Capitalism* Exam must be completed within the allocated time (*i.e.*, 6:30 - 7:30). It is a closed book, solo exam.
2. **Please read carefully.** The sentence structure can be critical.
Recall the material difference between e.g. (for example) and i.e. (that is).
3. As each student finishes the exam, that student will exchange that student's exam answer sheet for the answer key and leave the exam room until after the end of the exam (*i.e.*, 7:30, unless all students finish earlier: less likely than Memorization Exam).
4. Grades will be posted to BlackBoard no later than 5:00 PM Monday, February 14. An email notice of the posting will be sent.
5. **The *Natural Capitalism* Exam is worth 20% of the course grade.**
The exam has 35 questions graded as if there are 33.
Harmless errors are far more likely than non-harmless errors in this test design. Based on a statistical analysis of all students' answers, the instructor unilaterally may alter the grading of specific exam questions for all similarly situated students. Any student may appeal the grading of the exam's questions. However, only if a student successfully appeals the ambiguity of AT LEAST THREE questions on the exam will *that* student's exam grade change by the number of successful appeals in excess of two questions.
Appeals only affect the exam grades of those students that appeal.
6. **All appeals** of the exam's questions must be:
[6A] typed; [6B] signed by the student in three ways, typed name, handwritten signature, and typed social security number; [6C] in sequence, list, immediately following the signature, each of the questions, by number, being appealed; [6D] after the [6C] list, argue each question, one at a time; [6E] at the beginning of each question's appeal, identify two or more reasonable meanings that the question could have had; [6F] argue why one or more of the identified reasonable meanings is *as* appropriate or is *more* appropriate than the meaning used for the answer key answer; and [6G] personally handed to the instructor
no later than 6:00 PM on Thursday, February 17.

QUESTIONS:

1. T F Because of both spillover benefits **and** spillover costs, **but** especially spillovers aggregating up through the production system, markets of a global economy are less likely than markets of a more local economy to accurately value to damage to one **or** more ecosystems that are implicit critical inputs for that production system.
2. T F Switching from the current focus of marketing a sale of goods to marketing of a cradle-to-cradle sale of services **and** flows from those goods would tend to align more closely a manufacturer's interests with the environment's interests.
3. T F Factor Ten efficiency is feasible for goods, **but** is **not** feasible for services.
4. T F There is **no** credible scientific evidence of industrial human actions causing the Greenhouse Effect.
5. T F World oil supply, in response to price signals, has **and** will continue to indefinitely exceed world oil demand.
6. T F Industrial production systems optimize all related feedback loops.
7. T F Industrial production systems minimize waste both internal to **and** external to the production systems.
8. T F If both a process **and** the measurement **and** control of that process is more local, then superior optimization of both that process **and** related process is more likely, **but not** a necessary outcome.
9. T F Industrial production designs are cyclic.

10. T F Biomimicry can inform both the design of specific manufacturing processes **as well as** inform the structure **and** function of the entire economy.
11. T F Building design reflects that the total cost of energy consumption is a mere fraction of the total cost of energy consuming capital investments. Building design reflects a rational implementation of the Rule of 72.
12. T F Because the greatest savings for the entire system most often are available from capturing downstream savings, **and** because downstream savings are most often captured by downstream consumers, the primary champions of downstream savings are upstream merchants.
13. T F Efficiency tends to be capitalized.
14. T F Design is applied foresight.
15. T F Optimizing system components individually tends to aggregate to an optimized system.
16. T F Downstream savings are a pernicious incentive for downstream users.
17. T F *Muda* is any human activity that absorbs resources that creates value.
18. T F Lean thinking urges competition against absolute perfection.
19. T F As compared with direct management by government, price signals that arrive in a synchronized fashion relative to a system's needs can better organize complex system interactions **and** better incite innovation.

20. T F Manufactured capital is a true substitute for natural capital.
21. T F Subsidies encourage behavior needed by the subsidized process.
22. T F Current fiber (*i.e., natural **and** manufactured*) production is sustainable.
23. T F Opening material loops
increases the maximum feasible output
for both the system's local segments **and** the entire system.
24. T F From a technological perspective,
industrial agriculture has been very successful.
25. T F Farms,
as natural systems, offer many opportunities to use
the four forms of capital
(*i.e., human, financial, manufactured, **and** natural*)
of Natural Capitalism
as well as to use
the four central strategies
(*i.e., radical resource productivity, biomimicry,
service **and** flow economy, **and** investing in natural capital*)
of Natural Capitalism.
26. T F Fresh water is a slack variable.
27. T F The current manufactured systems for the delivery of **and** the recovery of
fresh water
rely on price signals to allocate fresh water to the highest **and** best uses.
28. T F Human behavior has **not** altered **and** can **not** alter the Earth's climate.
29. T F A price signal
must be present, accurate, **and** synchronized
if
the price signal is to allocate an ecosystem's regenerative ability
in a beneficial manner.
30. T F On net,
the current array of market price signals **and** market decisions
reflect implicit assumptions that
the future is worthless **and** that the environment is **not** a relevant input.

31. T F Efficiency enhancing innovations are retarded by market barriers: including, **but not** limited to, decision makers that make decisions based upon **incomplete** information, **inaccurate** information, **and** exhibit an **irrational** resistance to relevant information flows.
32. T F Often, the cause of a current problem is a prior, narrowly tailored, technological solution to a different problem, **and** that prior solution revealed previously **unknown or misunderstood** feed back loops.
33. T F Social systems provide monetized resources **and** services. Natural systems provide **nonmonetized** resources **and** services.
34. T F An observer of a complex system will see that system through the lens of the observer's paradigm. Accordingly, any sufficiently advanced technology will be **indistinguishable** from magic.
35. T F Businesses will earn greater short-term profits by focus on narrowly defined subsystem revenue streams **and** avoiding internalization of known spillover costs. In contrast, greater long-term profits will require a broader whole system focus **and** management of spillover costs.