

Astr 202: Final Exam Review

The exam will consist of approximately 70 multiple choice questions. The exam is comprehensive. To do well on the exam, you should have a good grasp of all the material covered in lecture. About 30% of the exam will be on the new material covered since the last test.

I suggest you adopt the following strategy for studying for the exam:

- a) Use the review questions below to study the new material.
- b) Review the old tests.
- c) Study your lecture notes.

Remember, the exam is on Thursday, Dec. 16, 11am-1pm, **BRING A CALCULATOR: You will need to multiply and divide numbers.** The questions below are meant to help focus your attention on topics I think are most important. I may ask other questions as well.

- 1) How do we compute the birthrate of: communicable civilizations, planets with life, Earthlike planets, planets with intelligent life?
- 2) If given the number of civilizations in the Galaxy, be able to determine how many stars you would need to search before you are likely to find one.
- 3) What is the most efficient way to search for alien civilizations?
- 4) How long will it take for our population to double?
- 5) About how often do meteors with sufficient mass to destroy our civilization strike the Earth?
- 6) What role has disease played in shaping the history of our civilization?
- 7) At the current rate of consumption, how long will our supply of oil last?
- 8) How does stellar evolution affect the lifetime of a civilization?
- 9) Based upon recent observations, how long is our Universe expected to continue?
- 10) About how old could the oldest civilizations in our Galaxy be?
- 11) What have been the most important factors to influence the growth rate of our species over time?
- 12) What are the primary sources of energy available to us and how long will they last?
- 13) Interstellar travel is very costly. What would be our motivation for pursuing it?
- 14) What is the name of the first interstellar probe launched by humans?
- 15) How long will it take for the probe to reach the nearest stars?
- 16) Be able to describe the Project Orion and Daedalus starships.
 - a) Draw a sketch.

- b) What is the propulsion system?
 - c) How fast does it go?
 - d) How long would they take to reach the nearest stars?
- 17) How does a Bussard ramjet work?
 - 18) What speeds may it be able to obtain?
 - 19) What is time dilation? How can it be used to aid us in interstellar flight?
 - 20) What limits us from building a ship that can go the speed of light?
 - 21) Assuming we decide to colonize the galaxy, how would we go about doing it? If we utilized starships that went 10% the speed of light, about how long would it take us to colonize a string of planets between here and the other side of the galaxy (~70,000 ly away)?
 - 22) If colonization is possible, then what are some possible reasons aliens are not amongst us now? (or are they????)
 - 23) What part of the electromagnetic spectrum is best suited for interstellar communications? Why?
 - 24) What might the signal from another civilization look like?
 - 25) Using radio to communicate between ourselves and another civilization in the Galaxy, how would you go about estimating the time it takes for our message to be received?